



State of Washington Department of Ecology
**Cruise Ship Memorandum of
Understanding, Cruise Operations in
Washington State Inspection Report**

Northwest Regional Office

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Bellevue, WA 98008

Phone: (425) 649-7000
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Inspection Date July 29, 2019	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak, Scott Wurster
Entry Time: 09:06	Photos Taken <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Samples Taken <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Inspection Announced <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Discharges to: <input checked="" type="checkbox"/> Surface Water <input type="checkbox"/> Ground Water <input type="checkbox"/> Dewater <input type="checkbox"/> POTW
Exit Time: 11:44				
Name and Location of Site Inspected: AMSTERDAM, Holland America Line Pier 91 Seattle, Washington				Additional Participants/Inspectors: Jonathan Turvey, HAG P.J. McGuire, HAG Rohit Lamichane, HAG Alex Adams, Port of Seattle
On-Site Representative(s): Name/Title/Phone/e-mail Robert Day, Environmental Officer (EO) (outgoing) and Eddie Swift, EO (incoming)				
Responsible Official(s): Name/Title/Address/Phone/e-mail Patrick J. McGuire, Senior Director of Environmental Operations Holland America Group 300 Elliott Ave. West, Seattle WA 98119 206-626-3889 PMcGuire@HollandAmericaGroup.com				Other Facility Data: Notification made to Jonathan Turvey on July 25, 2019 Flag – Netherlands IMO #9188037

Section A: Areas Evaluated

<input checked="" type="checkbox"/> Black/Gray Wastewater System	<input checked="" type="checkbox"/> Residual Solids	<input checked="" type="checkbox"/> Records/Reports	<input checked="" type="checkbox"/> Hazardous Waste/ Solid Waste	<input checked="" type="checkbox"/> Sampling/Monitoring
<input checked="" type="checkbox"/> Discharge Locations	<input checked="" type="checkbox"/> Operation & Maintenance	<input checked="" type="checkbox"/> Sludge Handling/ Disposal	<input checked="" type="checkbox"/> Oily Bilge Water	<input checked="" type="checkbox"/> Other

Section B: For Vessels Discharging ≥ 1 nm from Berth and ≥ 6 Knots Only [2.1.3(A)]

<input type="checkbox"/> Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/> Operations as Described in Submitted Documentation	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/> Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: <input type="checkbox"/> Trigger Level for Shutdown: <input type="checkbox"/> Recorded Turbidity/Equivalent Levels Above Triggers: NOT APPLICABLE	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/> Disinfection Effectiveness Monitoring Equipment Functioning Properly	
Disinfection Effectiveness Monitoring:	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/> Disinfection System Operated and Maintained Properly	
Disinfection System:	

Section C: For Vessels Discharging Continuously [2.1.3(B)]		
<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:		
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
Disinfection Effectiveness Monitoring: <div style="text-align: center; font-size: 2em; opacity: 0.5;">NOT APPLICABLE</div>		
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
Disinfection System:		
Section D: General (Approved to Discharge)		
<input type="checkbox"/>	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyee Shoal, Middle Point (near Pt Townsend))	
<input type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	
<input type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	
<input type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
<input type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
<input type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	
Section E: General		
<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges found to be in the OCNMS, MOU waters or Washington state waters (MOU related waters). Further review will be done following the end of the season.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols are consistent with MOU requirements to not occur in MOU related waters.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	Hazardous protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste protocols are consistent with MOU requirements. Solid waste discharge records were reviewed and are maintained properly. No

	discharges or releases of solid wastes were found to be inconsistent with MOU requirements.
<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials,...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent and mercury vapor lamp bulbs protocols for management are consistent with MOU requirements.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Waste reduction/reuse/recycling opportunities appear to be maximized per MOU requirements.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash management is consistent with MOU requirements.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Ballast Water Managed Properly (per Wash regs –reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	The vessel employs ballast water exchange and does not de-ballast in MOU related waters.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	The discharge protocols are consistent with MOU requirements and are to not occur in OCNMS waters.

Additional General Questions

<input checked="" type="checkbox"/> How is deck runoff and hull cleaning handled (scuppers,...) (non-toxic/phosphate free cleaners, biodegradable)	Deck runoff and hull cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Restaurants and galleys use detergents and degreasers that are non-toxic and phosphate free.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste discharge protocols are consistent with MOU requirements and records reviewed show no discharges in MOU related waters.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains are reported as connected to blackwater.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	<0.1% sulfur fuel content or EGCS treated equivalent is used throughout the route.

Other:

Section F: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD ₅)	NOT APPLICABLE
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
pH	
Ammonia, Nitrogen	

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Holland America Line AMSTERDAM on July 29, 2019. Scott Wurster, Ecology NWRO, Spill Prevention Unit assisted in conducting the inspection and provided a bunkering oil spill prevention inspection. The main contacts on board the AMSTERDAM were Robert Day, the outgoing Environmental Officer (EO), and Eddie Swift, the oncoming EO for the vessel. Patrick J. McGuire, Senior Director of Environmental Programs for Holland America Group (HAG), Jonathan Turvey, Director, Environmental Compliance Program, HAG, and Rohit Lamichane, HAG also joined us for the inspection. Prior notification of the visit was given on July 25, 2019 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The AMSTERDAM is not approved to discharge wastewater in MOU waters.

The AMSTERDAM was delivered in 2000, and is 780 feet long with about a 26-foot draft. The passenger capacity is approximately 1380 with a crew capacity of about 615. The vessel has two Azipods and five engines. The AMSTERDAM is scheduled for 10 port calls in Seattle for two week cruises to Alaska between June 3, 2019 and September 23, 2019. The vessel stops in Victoria prior to the Seattle port call.

Inspection

We arrived and boarded the ship (photo #01) at 9:06 a.m. and began with introductions and a plan for the day with Robert Day, the outgoing EO and was later joined by Eddie Swift, the incoming EO. We started on the Bridge and discussed various waste streams and discharge protocols and locations of discharges with navigation staff. We viewed the fuel bunkering. We then went to the Engine Control Room (ECR) to view records, and inspect fuel bunkering procedures. We then viewed the garbage room material sorting, food waste, recycling, photo waste handling, and the EGCS soot filter. We reviewed NAPA records, and then headed below deck to view the marine sanitation device (MSD), the oily bilge system and the Exhaust Gas Cleaning System (EGCS). The inspection was then finalized with a brief debriefing and I disembarked the vessel at 11:44 a.m.

Discharge Types and Protocols in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters):

The discharge protocols start with voyage plans for each itinerary prior to that route and overview meetings as new staff comes on. A matrix (photo #02) is developed for each route upon a detailed review of locations for allowed discharges, holding ability of the various wastestreams, and other requirements. The matrix for the Seattle/Alaska route details no discharges in Washington State waters, the international waters of the Strait of Juan de Fuca and the Olympic Coast National Marine Sanctuary (OCNMS) for

- bilge water (per MOU);
- blackwater (per MOU and NDZ (photo #04));
- graywater (per MOU);
- food waste (per MOU);
- exhaust gas cleaning system use not in the OCNMS and company policy = EGCS while maneuvering, then no EGCS alongside (use of shore power);
- ballast and biofouling water >200nm.

Incineration (photo #08), EGCS, and brine discharges are the only exceptions within 12 nautical miles (and in MOU related waters).

The ECR staff communicate with the Bridge prior to any discharge, and the bridge verifies the location (photo # 03) per the daily schedule. Communications are done by either phone or speaker. All discharges are logged in the electronic NAPA system with notice to the EO. The ECR acknowledges the Bridge logs and the ECR enters the blackwater and graywater discharges which are acknowledged by the Bridge. All discharges are stopped before entering the OCNMS including the EGCS system. Fuel switching is conducted prior to EGCS shut-down to assure Emission Control Area (ECA)-compliant fuel is being used. The EGCS may be re-started after exiting the OCNMS inbound to Victoria. The NAPA system is used to electronically log all discharges and there is an electronic recording of discharge ports opening and closing. For black water and gray water, the latitude and longitude coordinates are recorded in the NAPA Permeate as their *Sewage and Graywater Discharge Record Book* (photo #16), which is electronic and was reviewed for recent discharges. The date, time and location of both the start and the stop of the discharges are recorded, along with the discharge valve ID, volume, discharge type, flow rate, speed and distance from land (at start). Discharge ports are padlocked with the keys held in an electronic security system (photo #07) that allows only those authorized for certain keys to be allowed to access them. When a key is pulled out, it is recorded. Electronic recordkeeping requires logins and passwords and date and time stamps each entry with a specific name. Data changes are tracked.

Discharge Types

Blackwater and Graywater:

Blackwater, which includes toilet waste, is treated by a traditional MSD – Hamworthy Super Trident (photo #18), and graywater, which includes sink and shower water, laundry water, galley and pulper water and spa water, is discharged untreated outside of MOU related waters. There are three Hamworthy MSDs on board which are original to the vessel. Blackwater is collected by vacuum to a tank, then goes through prefiltration. Liquid moves to the next part of the tank for aeration. The liquid is then chlorinated and held until discharge. Solids skimmed off the bottom of the MSD are discharged outside of MOU related waters. No monitoring is required per the MOU (or USCG) and does not occur on the MSDs, other than for chlorine dosing. Blackwater can be held without discharge for about four to five days. Random blackwater/graywater discharge records were reviewed during the inspection, and showed no discharges in MOU related waters.

Bilge:

Dirty bilge water is first treated with a Westfalia centrifugal oily water separators (OWS) (photo #19) and is then sent to a static RWO OWS (photo #20) which treats to a level of less than 15 ppm. Prior to discharge, any OWS effluent goes through a white box (photo #21) to only allow discharges (photo #22) at less than 15 ppm oil content maximum. Any treated bilge that does not meet that level is sent by y-valve to the dirty bilge tank for re-processing. Discharges of treated oily bilge take place outside of MOU related waters. Staff confirmed that they were not aware of any rerouting of bilge to avoid proper treatment. All bilge equipment is labeled to prevent tampering and the area is monitored and video recorded. Any graywater that would overflow to the bilge, is treated as bilge. If blackwater were to overflow to bilge, it would also be treated as bilge and discharged per the more stringent of the two wastestreams. The oil record book (photo #06) was reviewed during the inspection.

Ballast and Pools:

Ballast water is not treated on board currently and exchanges are managed in open sea (>200 nm from outside EEZ, >50 nm if not EEZ). Stability is managed with the various tanks on the vessel.

Pools:

There are two pools which use bromine for disinfection. Pools and spas are drained outside of MOU related waters. If a pool or spa incident occurs, the pool is closed until outside of MOU related waters for draining.

Food Waste:

Food waste is sorted at the source in galleys and sculleries and is then collected and sent to the SOMAT food pulper (photo #11). Pulped food waste is put in bins (photo #12) and emptied via the food chute with a ramp (photo #15). Some material is composted in Victoria. The food chute is padlocked and controlled with Bridge approval and the EO. The EO inspects food sorting and training is provided to prevent non-food material from going to the pulper or overboard. Grease is collected (photo #13) and combined with cooking oil for recycling. Water from the press is sent untreated overboard outside of MOU related waters. Galleys use Ecolab phosphate free and non-toxic detergents and degreasers. Food waste discharges are logged in the NAPA system.

Outside Vessel:

Deck wash is done with NPDES VGP allowed materials (non-toxic, phosphate free, biodegradable cleaners) and processes. Outside vessel maintenance such as paint chipping and painting would only be done at port with Port of Seattle permission following best management practices.

Laundry:

Dry cleaning is done on board with a wet eco-friendly system with no waste. Laundry water is sent to graywater and discharged untreated outside of MOU related waters.

Medication:

Unused or outdated medications are incinerated. Narcotics go through a denature system to render inert and are then incinerated. Red bag waste in the medical facility is incinerated. Sharps are sent to the hazardous waste locker for off-loading as bio-hazardous waste. Drains from the medical facility go to the blackwater tanks.

Solid and Hazardous Waste:

Photo waste goes through a silver recovery unit (photo #14) with offloads in Victoria when silver is less than 5 ppm. Tests are logged and kept. X-rays are done digitally without any waste. Fluorescent bulbs are crushed on board with a mercury vapor removal system (bulb eater). Filters are offloaded as hazardous waste. Hazardous waste materials are stored separately offloaded only in Victoria on this route. Solid waste (garbage, recyclables, etc) is collected, sorted, and either reused, recycled, incinerated or off-loaded to shore as appropriate. Random garbage records (photo #17) were reviewed during the inspection, and showed no discharges in MOU related waters. Waste minimization efforts are done by tracking, material usage analysis, and minimizing materials such as single-use plastics and going to paper straws. All solid waste is offloaded in Victoria on this route.

EGCS:

ECA fuel-sulfur compliance is achieved either through the use of 0.1% sulfur content fuel, or with higher sulfur heavy fuel oil (HFO) treated by the EGCS to achieve equivalent emissions. The vessel uses an Ecospray Technologies wet scrubbers on board which is a wet open-loop system to minimize the sulfur oxide emissions (SOx). There are three separate scrubbers serving three of the five engines (the other two using low sulfur marine gas oil (MGO) fuel - <.001% sulfur). Seawater is pumped (photo #23) from a sea chest into the vessel and filtered (photo #24). It is sent to the top of the exhaust towers where nozzles spray the air emissions. A drain line sends the soot water to a soot filter (two of the three have the filter) (photos #09 and #10) that is mixed with a saltwater dilution as buffer and then discharged. Continuous meters (photo #25) monitor polycyclic aromatic hydrocarbons (PAH), and turbidity (photo #27) in the inlet and out of the filter. pH is measured continuously (photo #26) at the inlet and the overboard. The scrubbers are not used in the OCNMS, and it is company policy to not use the EGCS while alongside, using shore power instead. The sulfur ratio for the EGCS is typically 4.3, while this vessels aims for 3.2 for extra assurance. The vessel was bunkering fuel (photo #05) during the inspection.

Conclusions and Recommendations

The protocols for discharges are clear. Records were orderly and appeared consistent with the MOU. The treatment systems appear to be operating well.

Attachments:

Photographs

Copies to:

Patrick J. McGuire, Holland America Group
Jonathan Turvey, Holland America Group
Robert Day and Eddie Swift, Environmental Officers, AMSTERDAM
Mark Toy, Health
Donna Spalding, CLIA-NWC
Joseph Gellings, Port of Seattle
Alex Adams, Port of Seattle
Laura Fricke, Ecology
Amy Jankowiak, Ecology
Scott Wurster, Ecology
Central Files: Holland America Line – AMSTERDAM; WQ 6.1

Section H: Signatures

<u>Name and Signature of Inspector:</u> Amy Jankowiak, Compliance Specialist 	<u>Agency/Office/Telephone:</u> Department of Ecology Northwest Regional Office Water Quality Program Municipal Compliance Specialist 425-649-7195	<u>Date</u> 8/8/19
<u>Name and Signature of Reviewer:</u> Laura Fricke, Municipal Unit Supervisor 	<u>Agency/Office/Telephone:</u> Department of Ecology Northwest Regional Office Municipal Unit Supervisor 425-649-7103	<u>Date</u> 8/8/19

PHOTO ADDENDUM – AMSTERDAM

HOLLAND AMERICA LINE

JULY 29, 2019



Photo # 1 Image: IMG_0385 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Vessel

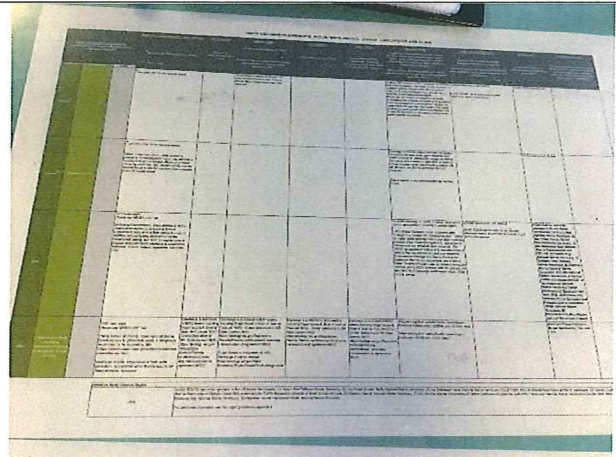


Photo # 2 Image: IMG_0347 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Bridge – Waste Discharge Requirements Matrix

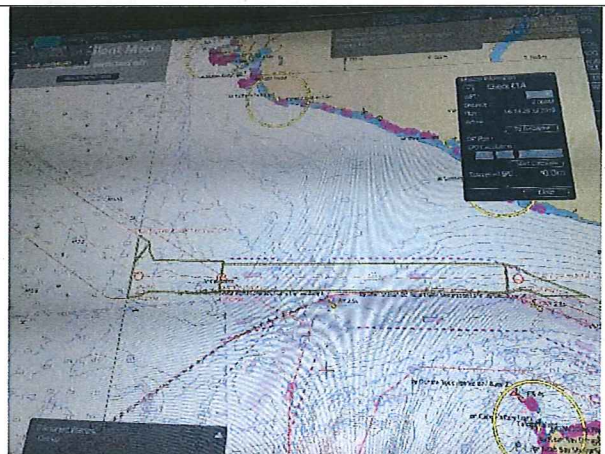


Photo # 3 Image: IMG_0349 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Bridge – Navigation Map entering Strait of Juan de Fuca

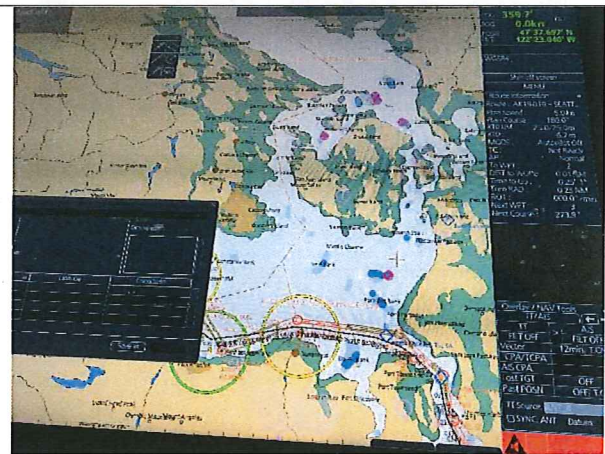


Photo # 4 Image: IMG_0350 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Bridge – Navigation map – “Puget Sound No Discharge Zone” labeled

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019



Photo # 5 Image: IMG_0353 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: Bridge – view of bunkering fuel

Name of Ship: Amsterdam Distinctive number or letters: PRAD

Date (dd/mm/yyyy)	Code (letter)	Item (number)	Record of operations/signature of officer in charge
28-Jul-2019	C	11.1	6.6. 20.000 TONN ALGO
		11.2	54.1 m ³
		11.3	26.5 m ³
28-Jul-2019	C	11.5	SHORE SETTING TANK 16.7E
		11.2	100 m ³
		11.3	1.6 m ³
28-Jul-2019	C	11.1	10.100 TONN ALGO
		11.2	13.6 m ³
		11.3	2.9 m ³
28-Jul-2019	C	11.1	SHORE SETTING TANK 16.7E
		11.2	2.5 m ³
		11.3	0 m ³
29-Jul-2019	D	13	2.0m ³ Fuel Engine Room Bilge Water
		14	5.0m ³ 0022 Slop 0051
		15.3	1.0m ³ Bilge Water 10.44
			14.3m ³ bilge water in Bilge Tank 10.44

Signature of Environmental Officer: [Signature] Date Signed: 29 Jul 2019
 (dd/mm/yyyy)
 Signature of Chief Engineer: _____ Date Signed: _____
 (dd/mm/yyyy)
 Signature of Master: _____ Date Signed: _____
 (dd/mm/yyyy)

16

Photo # 6 Image: IMG_0354 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: ECR – Oil Record Book



Photo # 7 Image: IMG_0355 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: ECR – electronic controlled emergency key lock system



Photo # 8 Image: IMG_0357 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: Garbage Room – Incinerator (green) and solid waste sorting table (stainless steel)

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019



Photo # 9 Image: IMG_0358 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – EGCS soot filters



Photo # 10 Image: IMG_0359 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – EGCS filter



Photo # 11 Image: IMG_0360 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – Somat food pulper (gray)



Photo # 12 Image: IMG_0362 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage room – pulped food waste

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019



Photo # 13 Image: IMG_0361 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – grease collectors



Photo # 15 Image: IMG_0364 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – Food Chute and ramp



Photo # 14 Image: IMG_0363 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Garbage Room – photo processing waste treatment – silver recovery

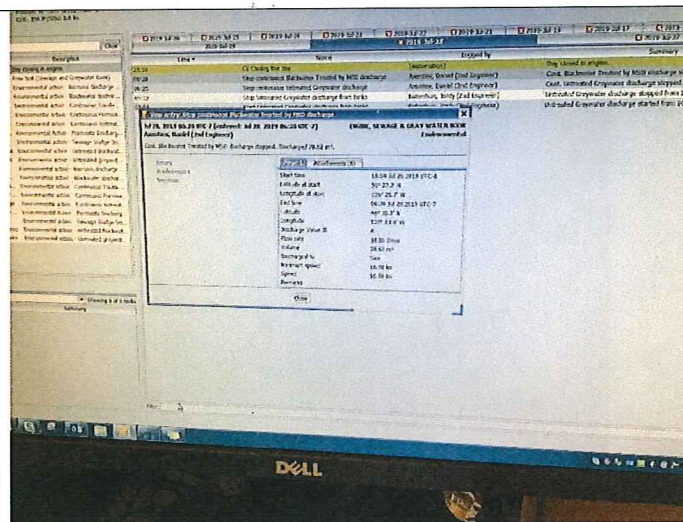


Photo # 16 Image: IMG_0366 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: NAPA log - blackwater

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019

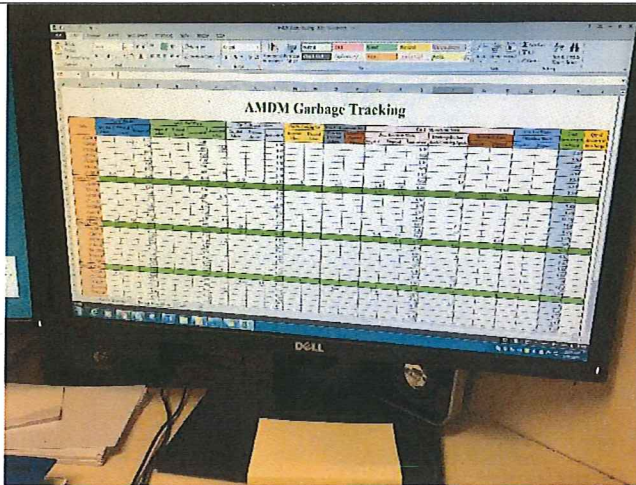


Photo # 17 Image: IMG_0367 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: NAPA – Garbage Log tracker

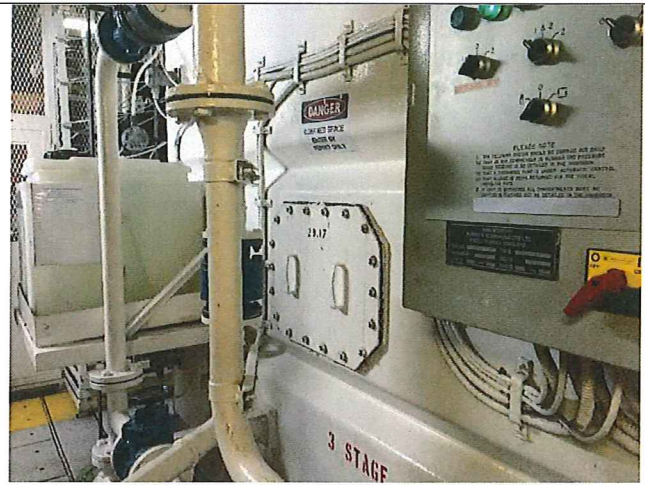


Photo # 18 Image: IMG_0369 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: MSD – Hamworthy Super Trident (1 of 3)



Photo # 19 Image: IMG_0372 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: Bilge – OWS - centrifugal



Photo # 20 Image: IMG_0373 Date: 7/29/2019
 Taken by: Amy Jankowiak
 Description: Bilge – OWS - static

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019



Photo # 21 Image: IMG_0375 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Bilge – White Box



Photo # 22 Image: IMG_0378 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: Bilge – Overboard Discharge Port



Photo # 23 Image: IMG_0379 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: EGCS - Pumps



Photo # 24 Image: IMG_0380 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: EGCS – intake filters

PHOTO ADDENDUM – AMSTERDAM
HOLLAND AMERICA LINE
JULY 29, 2019



Photo # 25 Image: IMG_0382 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: EGCS – Continuous Monitoring System (CMS) rack

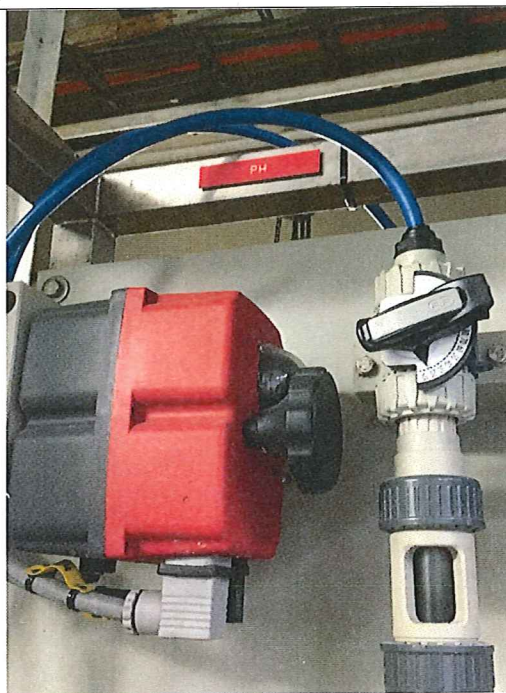


Photo # 26 Image: IMG_0383 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: EGCS – CMS pH

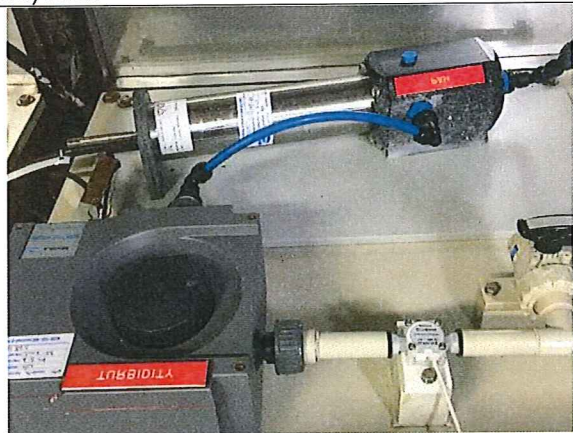


Photo # 27 Image: IMG_0384 Date: 7/29/2019
Taken by: Amy Jankowiak
Description: EGCS – CMS PAH and Turbidity



State of Washington Department of Ecology
**Cruise Ship Memorandum of
Understanding, Cruise Operations in
Washington State Inspection Report**

Northwest Regional Office

3190 160th Ave SE
Bellevue, WA 98008

Phone: (425) 649-7000
Fax: (425) 649-7098

Inspection Date September 28, 2019	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time: 08:52	Photos Taken	Samples Taken	Inspection Announced	Discharges to: <input checked="" type="checkbox"/> Surface Water
Exit Time: 11:22	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Ground Water <input type="checkbox"/> Dewater <input type="checkbox"/> POTW
Name and Location of Site Inspected: NORWEGIAN JOY, Norwegian Cruise Line Pier 66 Seattle, Washington				Additional Participants/Inspectors: Evan Dobrowski, Ecology
On-Site Representative(s): Name/Title/Phone/e-mail Fulvio Boatta, Environmental Officer				
Responsible Official(s): Name/Title/Address/Phone/e-mail Sarah Ferguson-Brown, Director, Environmental Operations Norwegian Cruise Line Holdings, Ltd. 7665 Corporate Center Drive Miami, FL 33126 305-436-4349; sbrown@nclcorp.com				Other Facility Data: Notification made to Sarah Brown on September 25, 2019 Flag – Bahamas IMO #9703796

Section A: Areas Evaluated

<input checked="" type="checkbox"/> Black/Gray Wastewater System	<input checked="" type="checkbox"/> Residual Solids	<input checked="" type="checkbox"/> Records/Reports	<input checked="" type="checkbox"/> Hazardous Waste/ Solid Waste	<input checked="" type="checkbox"/> Sampling/Monitoring
<input checked="" type="checkbox"/> Discharge Locations	<input checked="" type="checkbox"/> Operation & Maintenance	<input checked="" type="checkbox"/> Sludge Handling/ Disposal	<input checked="" type="checkbox"/> Oily Bilge Water	<input checked="" type="checkbox"/> Other

Section B: For Vessels Discharging ≥ 1 nm from Berth and ≥ 6 Knots Only [2.1.3(A)]

<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
	Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
	Disinfection Effectiveness Monitoring:	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
	Disinfection System:	

Section C: For Vessels Discharging Continuously [2.1.3(B)]

<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
<u>Turbidity or Equivalent:</u> Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:		
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
<u>Disinfection Effectiveness Monitoring:</u> <div style="text-align: center; font-size: 2em; opacity: 0.5;">NOT APPLICABLE</div>		
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
<u>Disinfection System:</u>		
Section D: General (Approved to Discharge)		
<input type="checkbox"/>	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyee Shoal, Middle Point (near Pt Townsend))	
<input type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	
<input type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	
<input type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
<input type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
<input type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (Homeported) or 1/40 Calls for Continuous	
Section E: General		
<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges found to be in the OCNMS, MOU waters or Washington state waters (MOU related waters). Further review will be done following the end of the season.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols are consistent with MOU requirements to not occur in MOU related waters.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	Hazardous protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste protocols are consistent with MOU requirements. Solid waste discharge records were reviewed and are maintained properly. No

	discharges or releases of solid wastes were found to be inconsistent with MOU requirements.
<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent and mercury vapor lamp bulbs protocols for management are consistent with MOU requirements.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Waste reduction/reuse/recycling opportunities appear to be maximized per MOU requirements.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash management is consistent with MOU requirements.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Ballast Water Managed Properly (per Wash regs –reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	The vessel employs ballast water exchange and does not de-ballast in MOU related waters.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	The discharge protocols are consistent with MOU requirements and are to not occur in OCNMS waters.

Additional General Questions

<input checked="" type="checkbox"/> How is deck runoff and hull cleaning handled (scuppers...) (non-toxic/phosphate free cleaners, biodegradable)	Deck runoff and hull cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Restaurants and galleys use detergents and degreasers that are non-toxic and phosphate free.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste discharge protocols are consistent with MOU requirements and records reviewed show no discharges in MOU related waters.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains are reported as connected to blackwater.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	<0.1% sulfur fuel content or EGCS treated equivalent is used throughout the route.

Other:

Section F: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD ₅)	NOT APPLICABLE
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
Ph	
Ammonia, Nitrogen	

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Norwegian Cruise Line's NORWEGIAN JOY on September 28, 2019. Evan Dobrowski, Ecology NWRO-WQ, assisted in conducting the inspection. The main contact on board the NORWEGIAN JOY was Fulvio Boatta, Environmental Officer (EO) for the vessel. Prior notification of the visit was given on September 25, 2019 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The NORWEGIAN JOY is not approved to discharge wastewater in MOU waters.

The NORWEGIAN JOY launched in 2017, and is 1,094 feet long with about a 28-foot draft. The passenger capacity is approximately 3,800 with a crew capacity of about 1,700. The vessel has five engines, two azipods and 3 thrusters for propulsion. The NORWEGIAN JOY is scheduled for 26 port calls in Seattle for weekly week cruises to Alaska between April 21, 2019 and October 5, 2019. The vessel stops in Victoria prior to the Seattle port call.

Inspection

We arrived and boarded the ship (photo #01) at 8:52 a.m. and began with introductions and a plan for the day with Fulvio Boatta, EO. We started on the Bridge and discussed various waste streams and discharge protocols and locations of discharges with navigation staff. We viewed the fuel bunkering. We then went to the Engine Control Room (ECR) to view records and discuss systems. We then viewed the Exhaust Gas Cleaning System (EGCS), bilge treatment, and the Scanship advanced wastewater treatment system (AWTS) for blackwater and graywater treatment. We then toured the garbage room material sorting, hazardous waste, food waste, and laundry. The inspection was then finalized with a brief debriefing and I disembarked the vessel at 11:22 a.m.

Discharge Types and Protocols in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters):

The discharge protocols start Seattle-Alaska season with voyage planning, meetings and trainings. In addition, there are regular departure meetings to go over the near-term plan, including Bridge staff and the EO. As the vessel travels into the Strait of Juan de Fuca from Alaska (photo #02), all discharge valves to water are shut off 12 miles outside the OCNMS. The vessel does not use the Canadian exemptions and holds all water discharges throughout the voyage into and out of Seattle to the sea. The vessel stops in Victoria on its way to Seattle and then back out through the Strait of Juan de Fuca. Discharges are then allowed again after exiting the Strait and more than 12 miles out to sea.

All overboard valves are locked and discharge ports are electronically closed. When in an area of allowed discharge, the protocol starts with the Bridge staff notifying the ECR staff that they are in an area of allowed discharge. A one-hour notice is provided to ECR staff when coming within 12 miles for discharges to stop. All discharges are recorded both on paper logbooks as well as in their electronic NAPA system. Comparisons of the two data points are completed daily. Electronic records show changes and history and as vessel staff log onto any computer, they use an access card which tracks the usage.

For black water and gray water, the latitude and longitude coordinates are recorded in the NAPA Permeate as their *Sewage and Graywater Discharge Record Book* (Sewage/Graywater Log), which is electronic and was reviewed for recent discharges. The date, time and location of both the start and the stop of the discharges are recorded, along with the volume, discharge type, flow rate, and speed. The recent Sewage/Graywater Logs were reviewed and all discharges appeared to be outside of the MOU related waters.

Discharge Types

Blackwater and Graywater Scanship system (photo #04):

Black water moves by vacuum to the bio waste silos (photo #14). From the silos, it goes to the drum screens which provide pre-screening. Blackwater liquid goes to the drum screens then enters the biosteps. Graywater is collected in mixing tanks and then mixes with blackwater at the biosteps. Solids from the pre-screen are dried and incinerated or sent to the bioresidue tank. Gray water consists of sink, shower, galley water and laundry water. Biological treatment (biofilm on rotating plastic pieces with air added) occurs in the Biostep bioreactor.

After the biostep, polymers (photo #17) and coagulants are added (photo #18). Liquid then moves to the Dissolved Air Flotation (DAF) tanks for clarification. An air and water mixture is added to the bottom of the flotation tanks to keep turbulence at the bottom and to allow the solids to rise to the top, along with the help of the chemical addition. Skimmers on the top skim the solids into a sludge pocket which is then pumped to the bioresidue tank which is discharged outside of MOU related waters and more than 12 miles. Liquid flow then moves to the polishing filters (photos #15 and #16) for ultrafiltration.

Flow then moves to ultraviolet (UV) light disinfection (photo #11). There are two large UV units, which one can be in standby for cleaning (photo #13). The UV system is alarmed for bulb failure and intensity. Flow from the UV units is either discharged directly overboard via the discharge port (if in an area of allowed discharge) or is re-circulated to the mixing tanks (photo #12).

Total suspended solids (TSS) (equivalent to turbidity) is monitored continuously at UV disinfection. At the time of the inspection the TSS was 2.3 mg/l. If TSS exceeds 30 mg/l, the system automatically stops discharging and holds. PH is also monitored for adjustments. There are several monitors throughout the system that are used to access controls as well as in the ECR. The vessel conducts its own laboratory monitoring for process control, splits samples with a land-based lab for comparability. The vessel is approved to discharge continuously in Alaska, which has additional monitoring requirements.

Bilge:

Oily bilge water is collected to the dirty bilge settling tank and is first treated with either a Marinfloc oily water separator system (OWS) (photo #07) or an Alfa Laval centrifugal OWS (photo #08). The oily bilge is treated to less than 15 parts per million (ppm) oil content. Prior to discharge, the clean bilge is sent through "white box" (photo #10) which can't be bypassed and doesn't allow discharges of greater than 15 ppm. The treated oily bilge water is then discharged outside of MOU related waters at a maximum of 15 ppm, but typically 3-7 ppm, and outside of MOU related waters. The overboard discharge was locked during the inspection (photo #09). The Chief Engineer has the one key to the white box, and discharges of clean bilge and offloads of oily sludge are recorded in the Oil record Book. No bypasses or re-routing around the OWS or white box has been known to occur. If there is any water other than bilge that combines with bilge water, it would be treated as bilge for treatment. The vessel also has the ability to pump out the bilge to shore-based collection.

Ballast and Pools:

Ballast water is treated on board as necessary with a filter and UV treatment system. There are two main pools and 8 Jacuzzis. They are all fresh water and all discharges are done outside 12 miles (outside MOU related waters).

Food Waste:

Food waste is sorted at the source (photo #26) in galleys with a screen prior to the pulper (photo #27). Food is pulped to less than 12 nm and discharged outside of MOU related waters. Food waste that can't go through the pulper is collected and sent to the garbage room for shredding. The shredder (photo #22) has a direct overboard which is locked when not in use as approved by Bridge staff. Galleys use Ecolab phosphate free and non-toxic detergents and degreasers. Food waste discharges are logged in the NAPA system and Garbage Record Book.

Outside Vessel:

Deck wash is done with NPDES VGP allowed materials (non-toxic, phosphate free, biodegradable cleaners) and processes. Outside vessel maintenance such as paint chipping and painting would only be done at port with Port of Seattle permission following best management practices.

Laundry:

Dry cleaning is done on board with a wet eco-friendly system with no waste (photo #28). Chemicals are stored by type (photo #29). Laundry water is sent to graywater and discharged untreated outside of MOU related waters.

Medication:

Unused or outdated medications and narcotics are incinerated when outside 12 miles (outside MOU related waters). Red bag waste in the medical facility is incinerated or offloaded as hazardous waste. Sharps are sent to the hazardous waste locker for off-loading as bio-hazardous waste. Drains from the medical facility go to the blackwater tanks.

Solid and Hazardous Waste:

Photo waste (photo #24) goes through a silver recovery unit with offloads in Victoria when silver is less than 5 ppm. Tests are logged and kept. X-rays are done digitally without any waste. Fluorescent bulbs are crushed on board with a mercury vapor removal system (bulb crusher) (photo #23). Filters are offloaded as hazardous waste. Hazardous waste materials are stored separately and offloaded only in Victoria on this route. Solid waste (garbage, recyclables

(photo #21), etc) is collected, sorted (photo #19), and either reused, recycled, incinerated (photo #20) or off-loaded to shore as appropriate. Random garbage records were reviewed (photo #25) during the inspection and showed no discharges in MOU related waters. Waste minimization efforts are done by tracking, material usage analysis, and minimizing materials such as single-use plastics. The vessel is limiting plastic with biodegradable bottles and reusable water bottles for passengers. All solid waste is offloaded in Victoria on this route. Incinerator ash is offloaded in Victoria.

EGCS:

ECA fuel-sulfur compliance is achieved either through the use of 0.1% sulfur content fuel, or with higher sulfur heavy fuel oil (HFO) treated by the EGCS to achieve equivalent emissions. Marine gas oil (MGO) is typically used when the EGCS is not in use. The vessel is also equipped for shore power, though shore power is not available at Pier 66 in Seattle. The vessel was bunkering fuel (photo #03) during the inspection. During the inspection one of the five engines was on EGCS with HFO in closed mode, with all water from the EGCS was being held and not discharged. The vessel uses a Yara Marine hybrid EGCS. The hybrid system can operate in both open and closed loop. The closed loop includes bleed-off water which can be held in MOU related waters. Water is sent up the stack and spray nozzles clean the exhaust and send the water back down to a process tank and onto filtration (photo #05) before any discharge. The filters run in series. In closed-mode, the water is recirculated back through the system until bleeding off is necessary. Monitoring is done of both the air exhaust as well as the discharge water. A continuous emissions monitoring system (CEMS) (photo #06) measures pH, turbidity, PAH, and temperature. The system produces approximately 30 cubic meters of sludge (soot) per week. The EO monitors discharges from the EGCS including for any sheens which haven't been seen.

Conclusions and Recommendations

The protocols for discharges are clear. Records were orderly and appeared consistent with the MOU. The treatment systems appear to be operating well.

Attachments:

Photographs

Copies to:

James Mitchell, Norwegian Cruise Line

Morgan McCall, Norwegian Cruise Line

Fulvio Boatta, EO, Norwegian Joy

Mark Toy, Health

Donna Spalding, CLIA-NWC

Joseph Gellings, Port of Seattle

Alex Adams, Port of Seattle

Amy Jankowiak, Ecology

Evan Dobrowski, Ecology

Central Files: Norwegian Cruise Line – NORWEGIAN JOY; WQ 6.1

Section H: Signatures

<u>Name and Signature of Inspector:</u>	<u>Agency/Office/Telephone:</u>	<u>Date</u>
Amy Jankowiak, Compliance & Technical Assistance Unit Supervisor 	Department of Ecology Northwest Regional Office Water Quality Program 425-649-7195	10/11/19

**PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019**



Photo # 1 Image: IMG_0430 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Norwegian Joy Vessel



Photo # 2 Image: IMG_0431 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Bridge – Navigation map



Photo # 3 Image: IMG_0433 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Bridge – View of bunkering Fuel

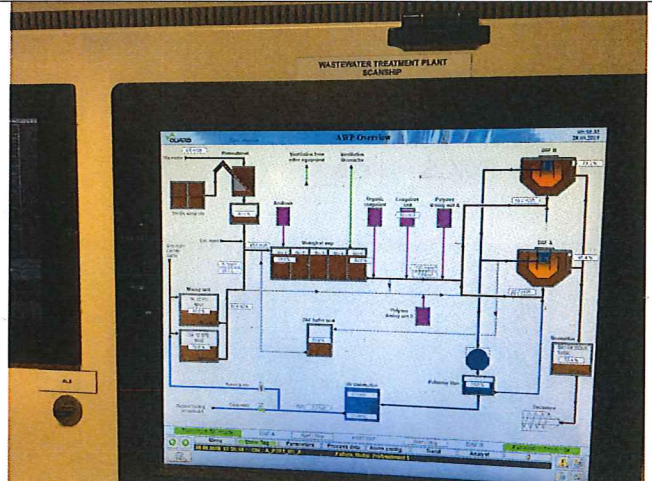


Photo # 4 Image: IMG_0435 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Engine Control Room – Scanship Schematic

PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019



Photo # 5 Image: IMG_2134 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: EGCS - filters

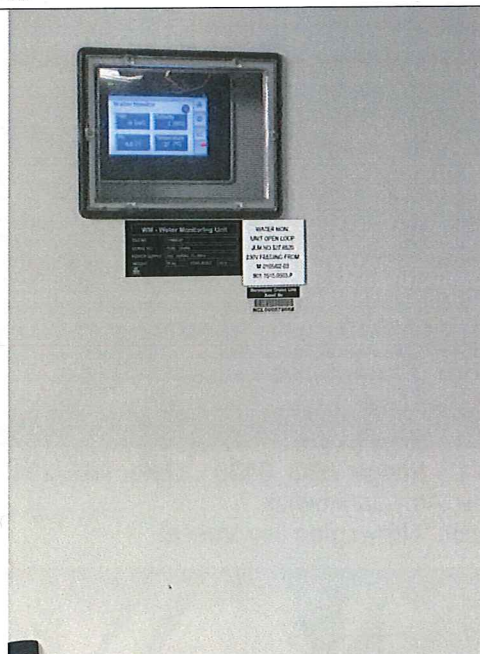


Photo # 6 Image: IMG_2136 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: EGCS – Continuous Emissions Monitoring System (CEMS)

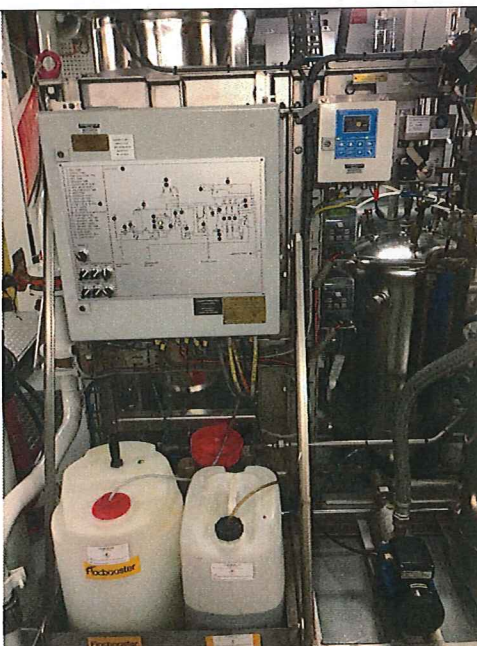


Photo # 7 Image: IMG_2139 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: Bilge – Marin Floc oily water separator (OWS)



Photo # 8 Image: IMG_2140 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: Bilge – centrifugal Alfa Laval OWS

PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
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Photo # 9 Image: IMG_2141 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Bilge – Overboard Discharge



Photo # 10 Image: IMG_2142 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Bilge – White Box



Photo # 11 Image: IMG_0436 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Scanship UV



Photo # 12 Image: IMG_0437 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Scanship effluent sample

PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019



Photo # 13 Image: IMG_2145 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Scanship UV cleaner chemical



Photo # 14 Image: IMG_2147 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Scanship Biostep silos (cylindrical)

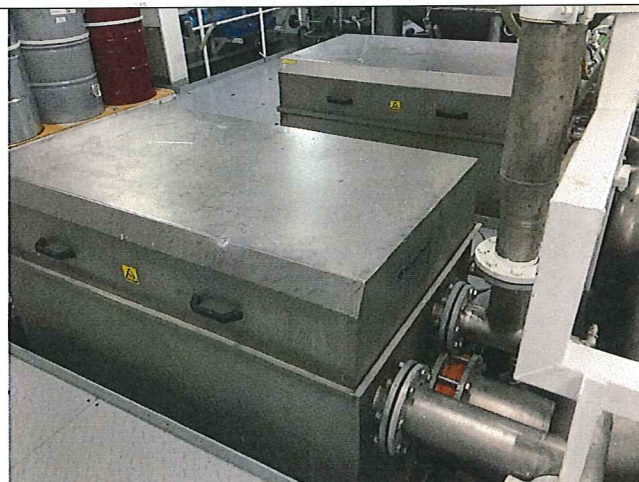


Photo # 15 Image: IMG_2152 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Scanship polishing filters

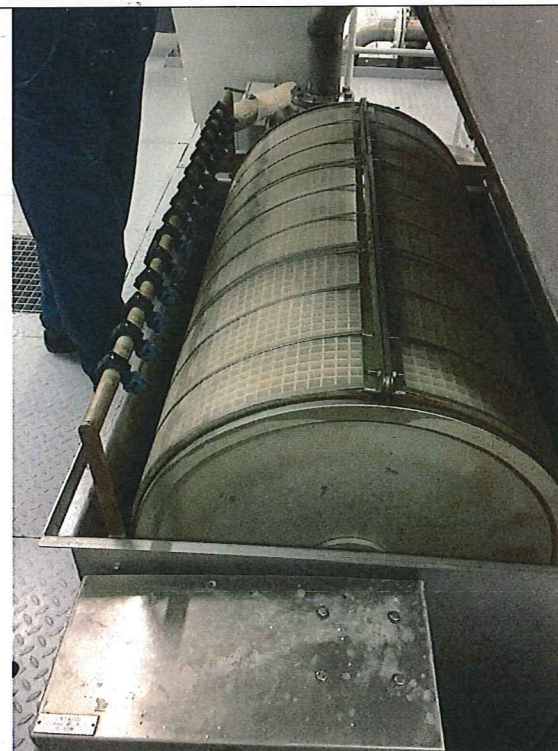


Photo # 16 Image: IMG_2153 Date: 9/28/2019
Taken by: Evan Dobrowski
Description: Scanship polishing filters - inside

PHOTO ADDENDUM – NORWEGIAN JOY
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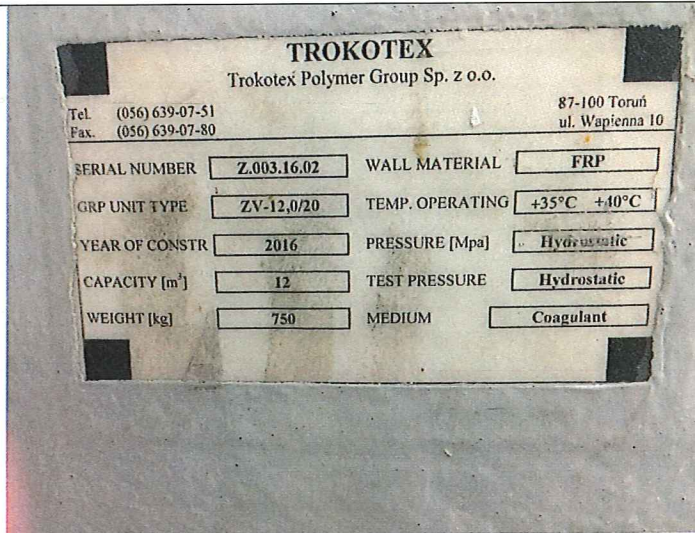


Photo # 17 Image: IMG_2158 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: Scanship polymer



Photo # 18 Image: IMG_2160 Date: 9/28/2019
 Taken by: Evan Dobrowski
 Description: Scanship Coagulant and Polymer dosing

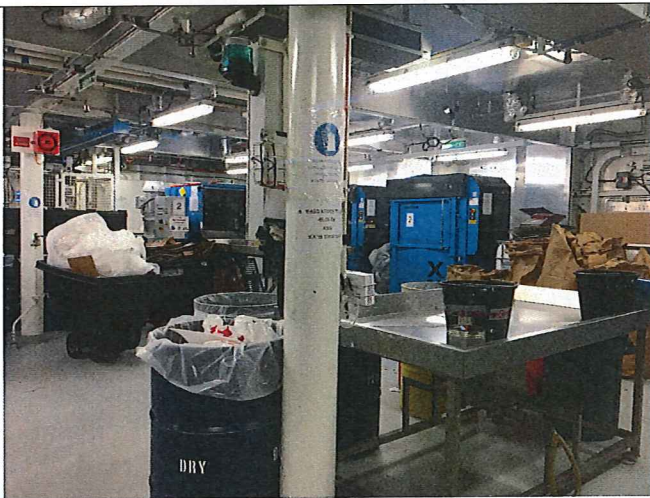


Photo # 19 Image: IMG_0438 Date: 9/28/2019
 Taken by: Amy Jankowiak
 Description: Garbage Room (GR)

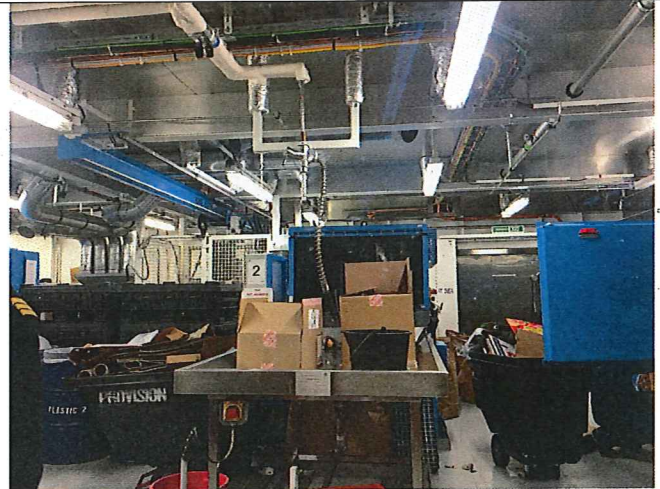


Photo # 20 Image: IMG_0439 Date: 9/28/2019
 Taken by: Amy Jankowiak
 Description: GR – Incinerator

**PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019**



Photo # 21 Image: IMG_0440 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: GR – Glass Crusher



Photo # 22 Image: IMG_0441 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: GR – Food Waste Shredder/Chute



Photo # 23 Image: IMG_0442 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: GR – Hazardous Waste Stor – Bulb Crusher



Photo # 24 Image: IMG_0444 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: GR – Hazardous Waste Stor – Photo Waste

**PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019**

Ship's name NORWEGIAN JOY Distinctive number or letters CCCP-3 IMO No. 9761246

Garbage categories: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.

Date/Time	Port or position of the ship (latitude/longitude and water depth if known)	Category	Estimated amount lost or discharged (m³)	Remarks on the reason for the discharge or loss and general remarks (e.g. reasonable precautions taken to prevent or minimize such discharge or accidental loss and general remarks)
28 Sep 2019 20:15:00	Port of Visalia	A	6	Plastic bagged
28 Sep 2019 20:15:00	Port of Visalia	B	23	USDA Waste
28 Sep 2019 20:15:00	Port of Visalia	C	53.3	Dry waste/On way/Glass food
28 Sep 2019 20:15:00	Port of Visalia	D	2	Cooking Oil
28 Sep 2019 20:15:00	Port of Visalia	F	30	Egg Shells To Trash

Photo # 25 Image: IMG_0445 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Garbage Record Book



Photo # 26 Image: IMG_0446 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Galley – Pulper screen



Photo # 27 Image: IMG_0447 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Galley - Pulper

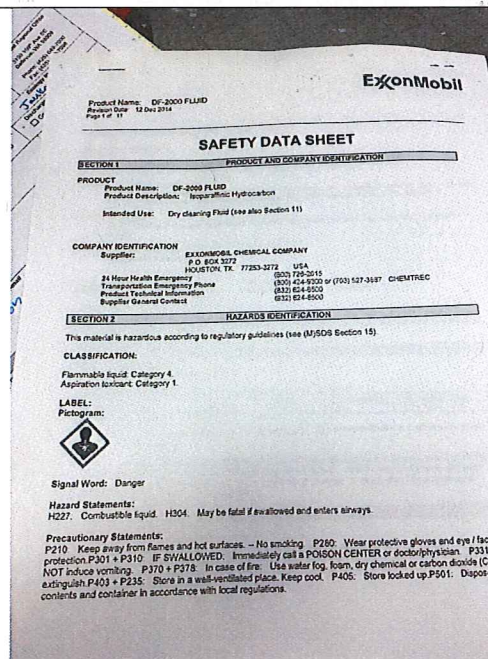


Photo # 28 Image: IMG_0448 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Laundry – MSDS dry cleaning

PHOTO ADDENDUM – NORWEGIAN JOY
NORWEGIAN CRUISE LINE
SEPTEMBER 28, 2019

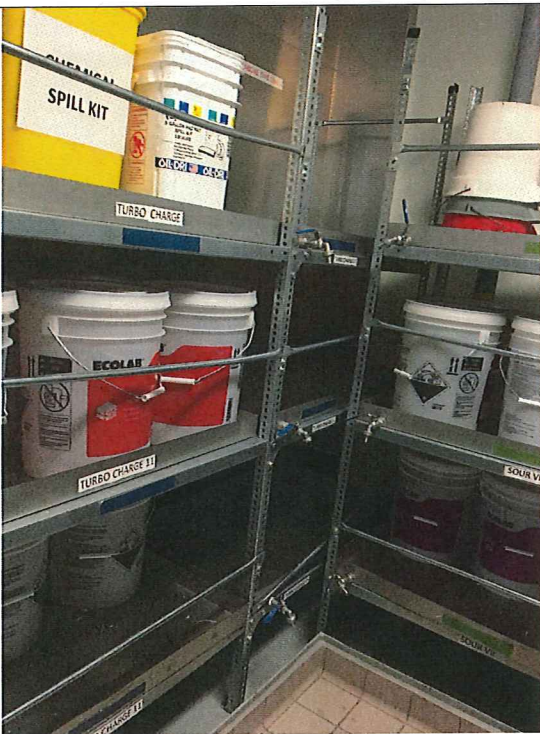


Photo # 29 Image: IMG_0449 Date: 9/28/2019
Taken by: Amy Jankowiak
Description: Laundry – Chem storage



State of Washington Department of Ecology
**Cruise Ship Memorandum of
Understanding, Cruise Operations in
Washington State Inspection Report**

Northwest Regional Office

3190 160th Ave SE
Bellevue, WA 98008

Phone: (425) 649-7000
Fax: (425) 649-7098

Inspection Date July 26, 2019	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time	Photos Taken	Samples Taken	Inspection Announced	Discharges to: <input checked="" type="checkbox"/> Surface Water
Exit Time	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Ground Water <input type="checkbox"/> Dewater <input type="checkbox"/> POTW
Name and Location of Site Inspected: OVATION OF THE SEAS, Royal Caribbean Cruises Ltd. Pier 91 Seattle, Washington				Additional Participants/Inspectors: Jason Reichert, Ecology
On-Site Representative(s): Name/Title/Phone/e-mail Morten Guldal, Environmental Officer				
Responsible Official(s): Name/Title/Address/Phone/e-mail Paul D'Annunzio, Manager, Environmental Stewardship Royal Caribbean Cruises Ltd. 1050 Caribbean Way, Miami, FL 33132 954-982-2418 pdannunzio@rccl.com				Other Facility Data: Notification made to John Hanley on July 23, 2019 Flag - Bahamas IMO # 9697753

Section A: Areas Evaluated

<input checked="" type="checkbox"/> Black/Gray Wastewater System	<input checked="" type="checkbox"/> Residual Solids	<input checked="" type="checkbox"/> Records/Reports	<input checked="" type="checkbox"/> Hazardous Waste/ Solid Waste	<input checked="" type="checkbox"/> Sampling/Monitoring
<input checked="" type="checkbox"/> Discharge Locations	<input checked="" type="checkbox"/> Operation & Maintenance	<input checked="" type="checkbox"/> Sludge Handling/ Disposal	<input checked="" type="checkbox"/> Oily Bilge Water	<input checked="" type="checkbox"/> Other

Section B: For Vessels Discharging ≥ 1 nm from Berth and ≥ 6 Knots Only [2.1.3(A)]

<input type="checkbox"/> Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/> Operations as Described in Submitted Documentation	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/> Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
<u>Turbidity or Equivalent:</u> Last Calibration: Trigger Level for Early Alarm: <input type="checkbox"/> Trigger Level for Shutdown: <input type="checkbox"/> Recorded Turbidity/Equivalent Levels Above Triggers:	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/> Disinfection Effectiveness Monitoring Equipment Functioning Properly	
<u>Disinfection Effectiveness Monitoring:</u>	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/> Disinfection System Operated and Maintained Properly	
<u>Disinfection System:</u>	

Section C: For Vessels Discharging Continuously [2.1.3(B)]		
<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:		
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
Disinfection Effectiveness Monitoring: <div style="text-align: center; font-size: 2em; opacity: 0.5;">NOT APPLICABLE</div>		
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
Disinfection System:		
Section D: General (Approved to Discharge)		
<input type="checkbox"/>	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyee Shoal, Middle Point (near Pt Townsend))	
<input type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	
<input type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	
<input type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
<input type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
<input type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	
Section E: General		
<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges found to be in the OCNMS, MOU waters or Washington state waters (MOU related waters). Further review will be done following the end of the season.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols are consistent with MOU requirements to not occur in MOU related waters.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	Hazardous protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste protocols are consistent with MOU requirements.

<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals management protocols may be consistent with MOU requirements.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Not reviewed.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Not reviewed.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Not reviewed.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Not reviewed.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Ballast Water Managed Properly (per Wash regs –reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	The vessel employs ballast water treatment in MOU related waters consistent with MOU requirements.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	The discharge protocols are consistent with MOU requirements and are to not occur in OCNMS waters.

Additional General Questions

<input checked="" type="checkbox"/> How is deck runoff and hull cleaning handled (scuppers...) (non-toxic/phosphate free cleaners, biodegradable)	Deck runoff and hull cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Restaurants and galleys use detergents and degreasers that are non-toxic and phosphate free.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste discharge protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains are reported as connected to blackwater.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	<0.1% sulfur fuel content or EGCS treated equivalent is used throughout the route.

Other:

Section F: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD ₅)	NOT APPLICABLE
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
pH	
Ammonia, Nitrogen	

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Royal Caribbean Cruises Ltd. OVATION OF THE SEAS on July 26, 2019. The main contact on board the OVATION OF THE SEAS was Morten Guldal, Environmental Officer (EO) for the vessel. Jason Reichert, Ecology Spills Prevention Unit also joined us for the inspection. Prior notification of the visit was given on July 23, 2019 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The OVATION OF THE SEAS is not approved to discharge wastewater in MOU waters.

The OVATION OF THE SEAS launched in February of 2016 and had its maiden voyage in April 2016. The cruise ship is 1,138 feet long and 136 feet wide with a 28 foot draft. The passenger capacity is approximately 4180 with about 1,500 crew. There are 18 decks with four engines and two Azipods. The OVATION OF THE SEAS is scheduled for 18 port calls in Seattle for weekly cruises to Alaska between May 24, 2019 and September 13, 2019.

Inspection

We arrived and boarded the ship (photos #01 and #02) at 9:21 a.m. and began with introductions and a plan for the day with Morten Guldal, EO. We discussed various waste streams and discharge protocols as well as locations of discharges on the Bridge. We viewed the fuel bunkering. We then went to the Engine Control Room (ECR) to view records (photo #06) and screen shots (photos # 07, 08, 09 and 11) to assist with the discussion of the treatment systems. We toured the AWP, food waste system and bilge treatment. We then looked at the EGCS up the tower and then the EGCS bleed-off treatment unit. We finalized with a brief debriefing and disembarked the vessel at 11:57 a.m.

Discharge Types and Protocols in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters):

The discharge protocols start with voyage plans (photo #03) for each itinerary prior to that route. A matrix (photo #10) is developed for each route upon a detailed review of locations for allowed discharges, holding ability of the various wastestreams, and other requirements. The voyage plan for the Seattle/Alaska route details no discharges in MOU related waters. Discharges are stopped at about 13 miles prior to MOU related waters. This vessel stops in Victoria prior to Seattle. Discharges are resumed 13 miles out of MOU related waters or per Canadian requirements. Maps (photo #04) show the area of stopped discharge prior to entering the OCNMS and Strait of Juan de Fuca.

If a discharge is to occur, the Bridge contacts the ECR staff when nearing a discharge location. Confirmations are made between the Bridge and ECR and discharge ports are opened. All discharges are logged in the NAPA system as well as in the ECR for certain discharge types. Treated sewage and graywater discharges are allowed in Canadian waters and then off again prior to MOU related waters. The vessel is approved for discharge in Alaska. For black water and gray water, the latitude and longitude coordinates are recorded in the *Sewage and Graywater Discharge Record Book* (photo #12). The date, time and location of both the start and the stop of the discharges are recorded, along with the discharge port, volume, effluent type, flow rate, and speed. The EGCS is off at about 4 nautical miles and put into closed loop per company policy.

Discharge Types

Scanship Advanced Wastewater Treatment System or Advanced Wastewater Purification (AWP):

There is one AWP on the vessel. Black water, which includes toilet waste, and infirmary drains moves by vacuum to one of five Evac collection tanks (photo #19). From the collection tanks, it goes to the screener. Solids are sent to the biowaste tank, then to the incinerator and liquid moves to a tank and is then pumped (photo #14) to the biostep. Gray water consists of sink, shower, galley water, laundry water and potentially pool water and is collected in one of two mixing tanks. From the mixing tanks, the liquid moves to the 5-step biostep (photo #13) for biological treatment (biofilm on rotating plastic pieces – air added with blowers. A defoamer can be used to control foam prior to the biostep.

After the biostep, liquid moves to a dosing unit where a mix of polymers and coagulants are added. Liquid then moves to one of two Dissolved Air Flotation (DAF) (clarification via dissolved air flotation tanks) (photo #15). An air and water mixture is added to the bottom of the flotation tanks to keep turbulence at the bottom and to allow the solids to rise to the top, along with the help of the chemical addition. Skimmers on the top skim the solids into a sludge pocket which is then pumped to the bioresidue tanks and to the decanter for drying and incineration. Some solids are sent back to the biostep for biological enhancement. Liquid flow then moves to one of the two polishing filters (photo #16) for ultrafiltration.

Liquid flow then moves to ultraviolet (UV) light disinfection (photo #17). There are two UV units, one on standby. Flow from the UV units is either discharged directly overboard via the discharge port, or is re-circulated (photo #18) to the mixing tanks. Grease from the galleys is collected to prevent it from entering and interfering with the Scanship AWP.

The cruise line uses a maintenance system for work orders and maintenance. Manufacturer recommendations for maintenance of each piece of equipment is included in the system which triggers staff when maintenance is required. Total suspended solids (TSS) (equivalent to turbidity) is monitored continuously at UV disinfection, as is the W/m2 (intensity). At the time of the inspection, the TSS was 6.2 and 5.6. If TSS exceeds 30 mg/l, the system automatically stops discharging and recirculates back to the mixing tank. PH is also monitored for adjustments and trigger the chemical additions of coagulant and polymer. There are several monitors throughout the system that are used to access controls as well as in the ECR. Coliform, chlorine, COD, TSS and pH is monitored regularly on board the vessel for system optimization and sampling is done an outside lab as required for Alaska DEC on this route. Random blackwater/graywater discharge records were reviewed during the inspection, and showed no discharges in MOU related waters.

Bilge:

Oily bilge water is treated with one of two Marine flocculent oily water separators (OWS). This includes pumping oily bilge water to a settling tank (photo #21), then onto processing in the MarinFloc OWS (photo #22). From there the clean bilge goes to the Clean Bilge Tank and is then discharged if in an area approved – outside of MOU related waters. A white box (photo #23) is used to only allow discharges (photo #24) at less than 5 ppm oil content maximum. Any treated bilge that does not meet that level is sent by y-valve to the dirty bilge tank and onto the dirty bilge settling tank for re-processing. The discharge protocol is to discharge treated oily bilge at less than 5 ppm outside of MOU related waters, at sea. The EO confirmed that he is not aware of any rerouting of oily bilge and that any staff can report concerns. Reports can be made through the staff/line or through the IMO whistleblower reporting. The OWS were off and recirculating (photo #25) during the inspection and not discharging.

Ballast:

Ballast water is treated on board with a separator system and UV disinfection. Stability is typically managed with the various tanks on the vessel.

Pools:

There are two pool indoor pools, two outdoor pools, and four whirlpools. Pools and whirlpools are emptied outside directly overboard if outside of MOU related waters, or if necessary when inside, the water is sent to the graywater mixing tanks.

Food Waste:

Food waste is sent from the galleys to food waste holding tanks. From there, the food waste goes through a pulper – food press (photo #20). The liquid from the pulper goes to the graywater mixing tanks and the AWP. The food goes to a biowaste dryer and incineration. Any food waste that can't be pulped is incinerated. A grease separator collects grease from the galleys and is combined with used cooking oil for on-shore recycling. Food waste discharges are logged in the NAPA system.

Outside Vessel:

Deck wash is done with NPDES VGP allowed materials (non-toxic, phosphate free, biodegradable cleaners) and processes. Outside vessel maintenance such as paint chipping and painting follows a SOP with the Port of Seattle and Best Management Practices are used when conducting work. It is first cleared with agents and port approval. BMPs include secondary containment for paint and two staff per painting, one to assure paint is contained.

Laundry:

Dry cleaning is done on board with a non-PERC system and no waste. Laundry water is sent to graywater and discharged outside of MOU related waters.

Hazardous Waste and Incineration:

Hazardous waste is not offloaded in Seattle, only in Victoria on this route. Incinerators (2) are not used in port, only underway.

Medication:

Unused or outdated pharmaceuticals are sent to the incinerator for disposal. Narcotics are sent to the blackwater system in the medical facility for security and keeping the narcotics from leaving the medical facility. Drains from the medical facility go to the blackwater tanks.

Solid Waste:

Solid waste (garbage, recyclables, etc) is collected, sorted, and either reused, recycled, incinerated or off-loaded to shore in Victoria on this route as appropriate.

EGCS:

The vessel has four main engines and two emergency generators. ECA fuel-sulfur compliance is achieved either through the use marine gas oil at about 0.01 % sulfur content (below the 0.1% sulfur content fuel ECA limit), or with higher sulfur heavy fuel oil (HFO) – typically 1.4-2.7% sulfur, treated by the EGCS to achieve equivalent emissions. The vessel was bunkering fuel (photo #05) during the inspection. It is the RCCL policy to be in closed loop within 4 nautical miles. The vessel uses a Wartsila hybrid EGCS on board which is a wet hybrid open-loop or closed-loop system to minimize the sulfur oxide emissions (SOx). There are two separate systems. In closed-loop, water is pumped (photo #26) from a process water tank (photo #27) up the scrubber (photos #29 and 31). Water is sprayed at the exhaust and is sent down the tower (photo #28) to the process tank. A de-aeration tank is used to settle the exhaust solids. Washwater is then treated by a centrifugal solids separator. A bleed-off treatment unit (photos #32 and #33) is used in closed-loop which includes the addition of coagulant, caustic soda, and flocculant/polymer (photo #35). The vessel has the ability to hold the bleed-off water for about 72 hours, depending on the sulfur content of the fuel and treatment. If the treated bleed-off is above the VGP limits, it recirculates for treatment. In open-loop, sweater is pumped from the seachest up the tower. A continuous monitoring system (CMS) (photos #30 and #34) is used to continuously monitor the discharge water, as well as influent for certain parameters. PAH, temperature, turbidity and pH are monitored at the effluent discharge. The bleed-off discharge is typically about 50 cubic meters per day (m³/day), with a capacity of 153 m³/day.

Conclusions and Recommendations

The protocols for discharges are clear. Records were orderly and appeared consistent with the MOU. The treatment systems appear to be operating well.

Attachments:

Photographs

Copies to:

John Hanley, Sr. Analyst, Environmental Operations and Compliance, RCCL
Morten Guldal, Environmental Officer, OVATION OF THE SEAS
Mark Toy, Health
Donna Spalding, CLIA-NWC
Joseph Gellings, Port of Seattle
Alex Adams, Port of Seattle
Laura Fricke, Ecology
Amy Jankowiak, Ecology
Jason Reichert, Ecology
Central Files: Royal Caribbean Cruises Ltd – OVATION OF THE SEAS WQ 6.1

Section H: Signatures

Name and Signature of Inspector:	Agency/Office/Telephone:	Date
Amy Jankowiak, Compliance Specialist 	Department of Ecology Northwest Regional Office Municipal Compliance Specialist 425-649-7195	8/8/19
Name and Signature of Reviewer:	Agency/Office/Telephone:	Date
Laura Fricke, Municipal Unit Supervisor 	Department of Ecology Northwest Regional Office Municipal Unit Supervisor 425-649-7103	8/8/19

PHOTO ADDENDUM – OVATION OF THE SEAS

ROYAL CARIBBEAN CRUISE LINE

JULY 26, 2019



Photo # 1 Image: IMG_0345 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Vessel



Photo # 2 Image: IMG_0346 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Vessel

DEPARTURE: ETD: 18:00 / 25-JUL-2019 10 m 10 m DEP YYY SULA S LT EAST 2
ARRIVAL: ETA Pilot: 00:30 / 26-JUL-2019 9 m 9 m ARR SGA SULA S LT EAST 1
Time change: NONE

VVJ SUNSET TIME: 20:59 LT
SEA SUNRISE TIME: 05:39 LT

WHALE REPORTING WEBSITE: <https://magify.com/wwsack/index.php> USER NAME: Ovation PASSVORSE: Ovation0206
VOYAGE REPORT WEBSITE: <https://callreport.rclclms.com/Account/Login?ReturnUrl=/321> USER NAME: Ovlde PASSVGRD: Ovation0206

Environment operation information:
Fuel and Air Emissions:
MARPOL North America ECA Compliant fuel (0.1% Sulfur, MGO) or use of Scrubbers in CLOSED loop required.
Air emission opacity limitation - should not exceed dark smoke more than 20% Ringeman scale more than 1 hour. Anything in excess (or suspected in excess), report to the Environmental Officer immediately.

All Discharge:
This leg is entirely Port condition. No discharges are allowed

Incinerators:
Incinerator use in Port of Victoria or Seattle is not allowed.
Start and Stop at specified way points as per voyage plan.

Marine Mammals
Avoid whale strike and follow the reporting protocols.

Other Discharges, other information
Soot blowing to be performed as per SOP. If possible, to be conducted with scrubbers running

Photo # 3 Image: IMG_0295 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Bridge – Voyage Plan

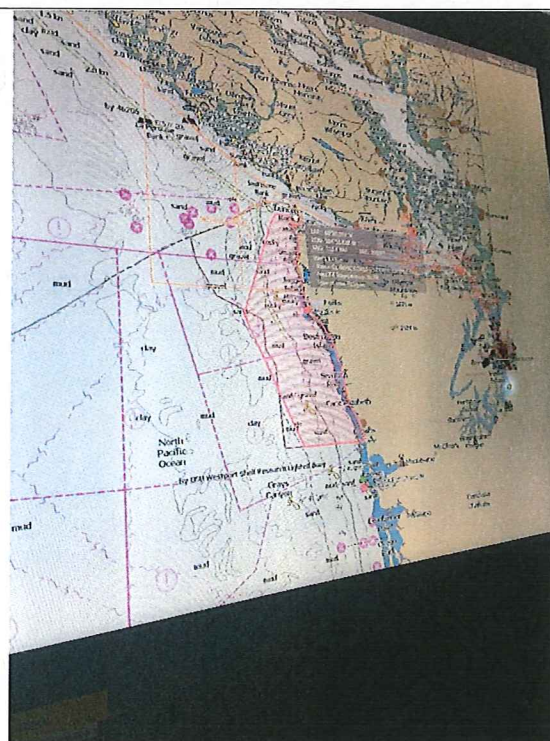


Photo # 4 Image: IMG_0296 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Bridge – Nav Map with OCNMS

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019



Photo # 5 Image: IMG_0297 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: Bridge – View of fuel bunkering

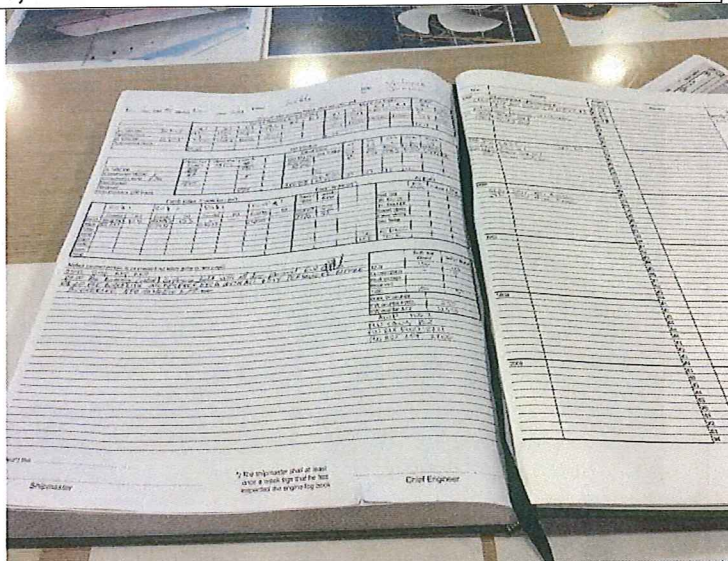


Photo # 6 Image: IMG_0301 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – Engine Log Book

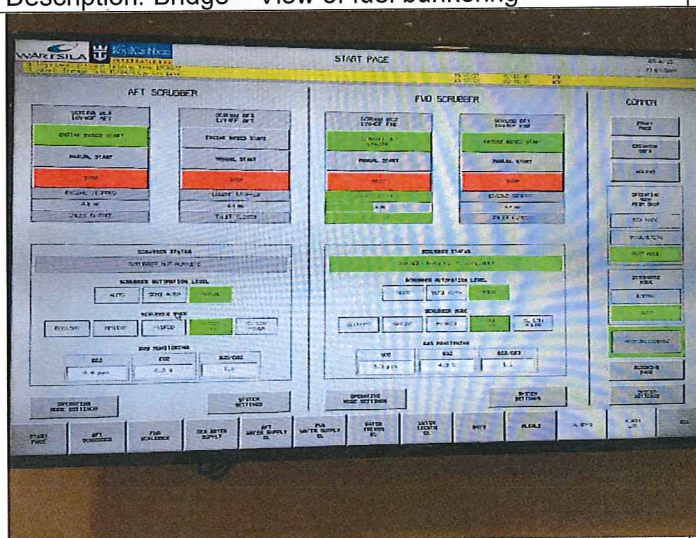


Photo # 7 Image: IMG_0303 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – EGCS Screen

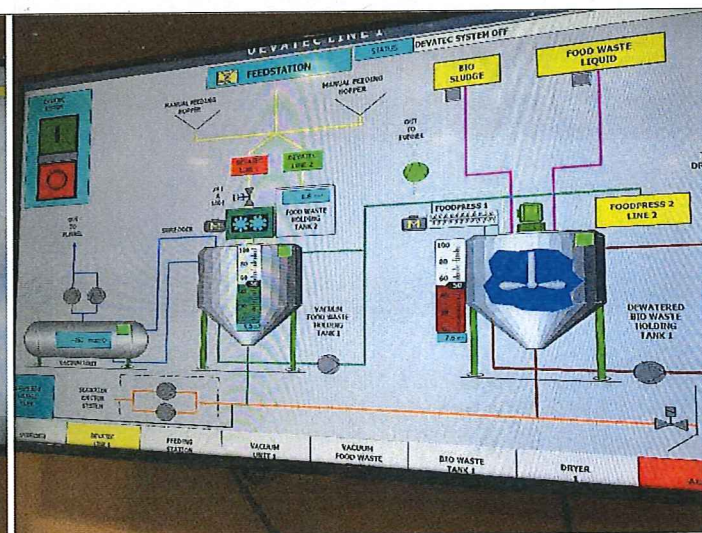


Photo # 8 Image: IMG_0304 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – Food Waste Screen

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019

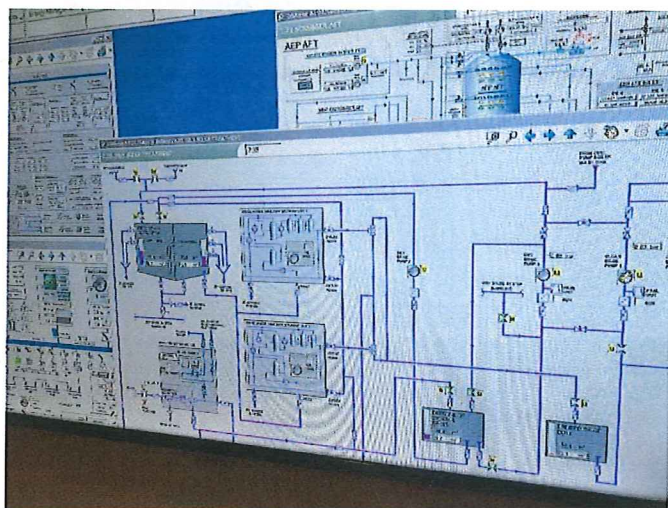


Photo # 9 Image: IMG_0305 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – Oily Bilge Screen

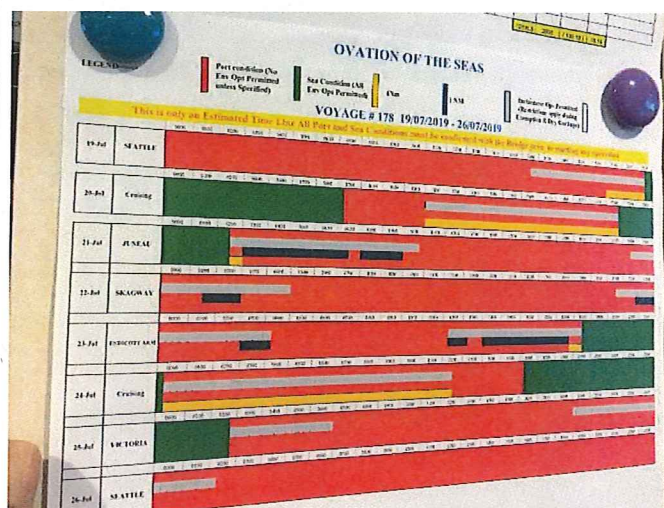


Photo # 10 Image: IMG_0306 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – Voyage Estimate Plan

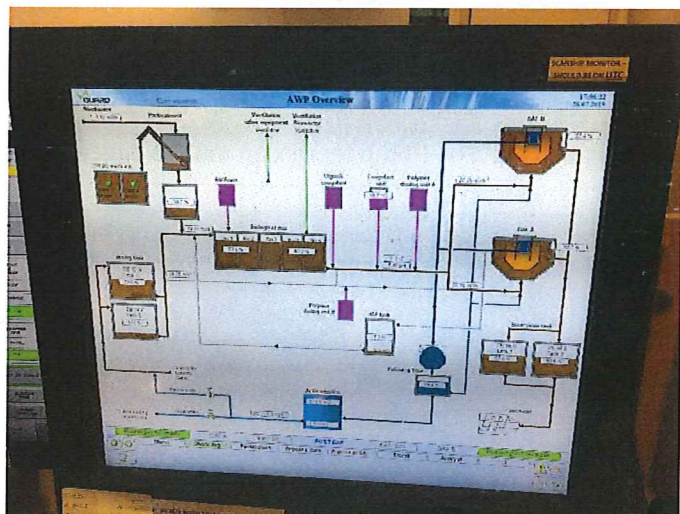


Photo # 11 Image: IMG_0307 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – AWP Screen

Sewage and Gray water Discharge Record Book for All Operations
 Vessel's Name: Ovation of the Seas IMO Number: 8607753

#	DISCHARGE DATE	TIME (24 HRS)	LAT	LONG	DISCHARGE PORTS	EFFLUENT TYPE	VOLUME (GAL)	FLOW RATE (GPM)	WATER SPEED (KTS)	PERSON IN CHARGE
#1	START 07/26/19 1705	STOP 07/26/19 0024	50°17'N	125°18'W	B	AWP	854	18.0	8.6	AWP-1
#2	START 07/26/19 1804	STOP 07/26/19 2257	50°05'N	125°26'W	E	AWP	80	62.4	8.7	AWP-2
#3	START 07/26/19 2117	STOP 07/26/19 0003	48°13'N	125°52'W	A	AWP	146	19.3	8.7	AWP-3
#4	START 07/26/19 2114	STOP 07/26/19 0003	48°13'N	125°52'W	B	AWP	479	19.3	8.7	AWP-4
#5	START 07/26/19 0005	STOP 07/26/19 0243	48°32'N	125°17'W	A	AWP	346	9.2	8.7	AWP-5

NOTES: Please sign and date any Reserve Master. OTH = Onboard Operator for please.

07/26/19 11:11 AM BACK AT 02:00 TO UTC-8

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Photo # 12 Image: IMG_0308 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: ECR – Blackwater and Graywater Log

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019

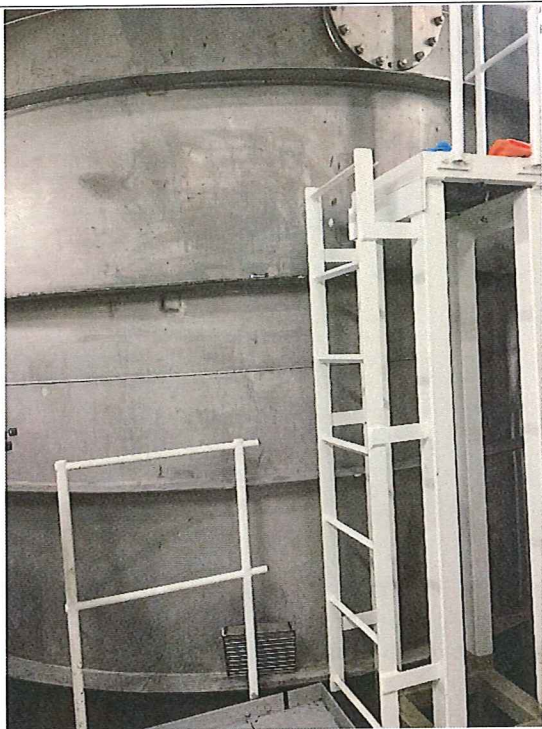


Photo # 13 Image: IMG_0310 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: AWP – Biostep tank (1 of 5)



Photo # 14 Image: IMG_0311 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: AWP – Pump for mixing tank to biostep

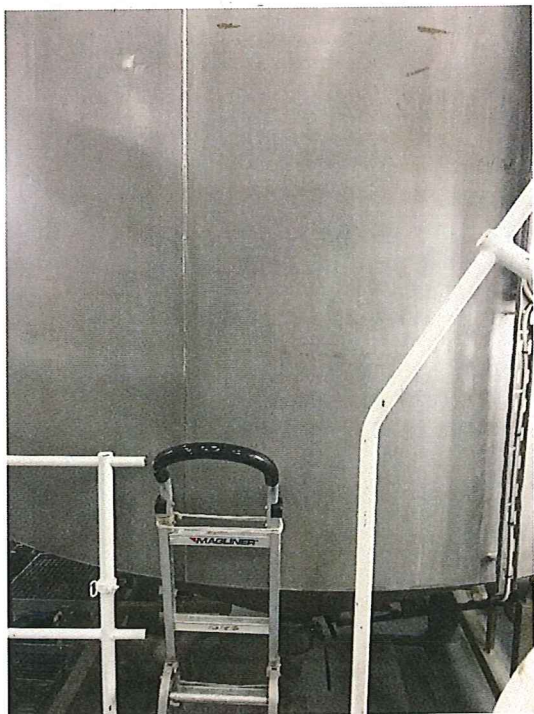


Photo # 15 Image: IMG_0314 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: AWP – DAF (1 of 2)



Photo # 16 Image: IMG_0315 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: AWP – Polishing filter (1 of 2)

**PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019**

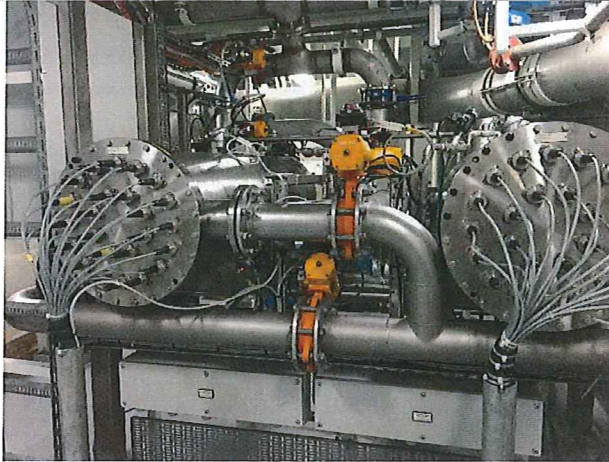


Photo # 17 Image: IMG_0316 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: AWP – UV disinfection units (2)

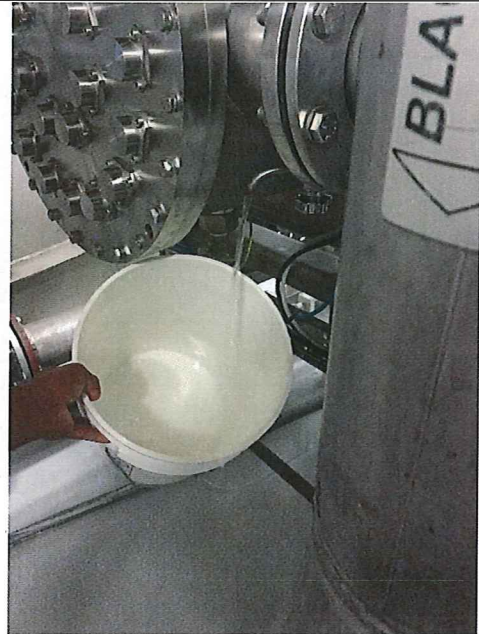


Photo # 18 Image: IMG_0317 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: AWP - Effluent

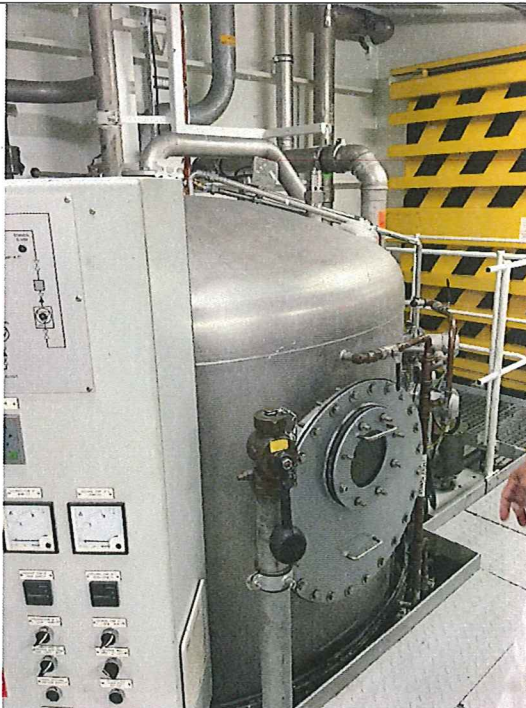


Photo # 19 Image: IMG_0320 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: AWP – Evac Tank (1 of 5)



Photo # 20 Image: IMG_0319 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Food Waste System

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019



Photo # 21 Image: IMG_0322 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Bilge Settling Tank

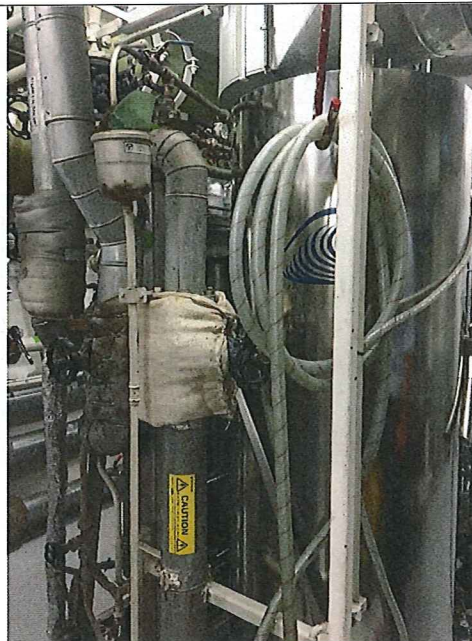


Photo # 22 Image: IMG_0323 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Bilge Oily Water Separator (1 of 2)



Photo # 23 Image: IMG_0324 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Clean Bilge White Box



Photo # 24 Image: IMG_0326 Date: 7/26/2019
Taken by: Amy Jankowiak
Description: Clean Bilge Overboard Discharge Port

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019

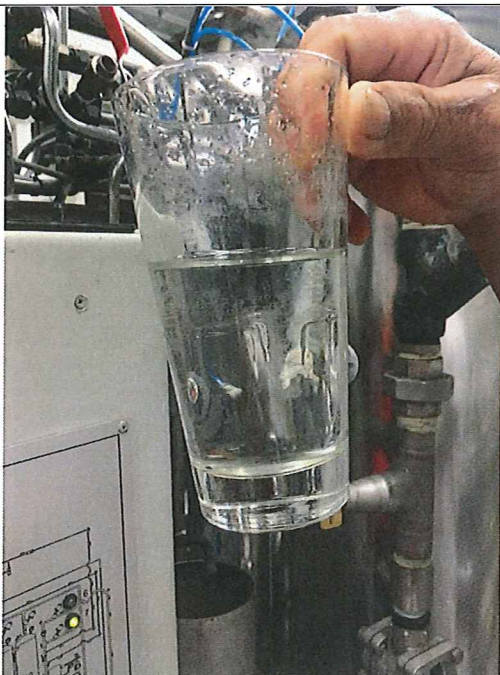


Photo # 25 Image: IMG_0327 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: Clean Bilge Effluent

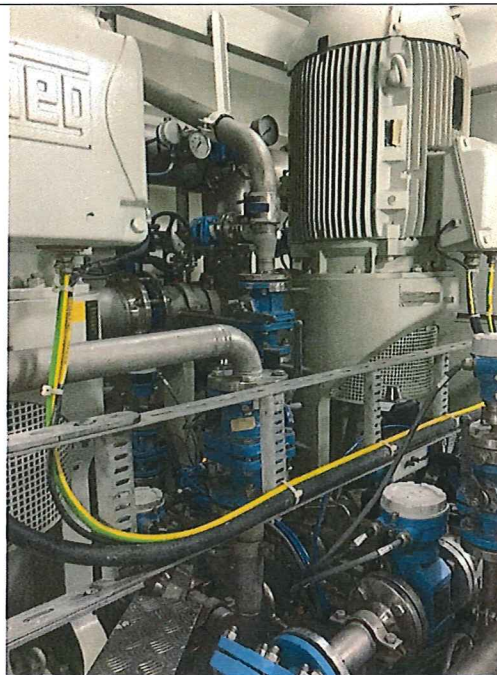


Photo # 26 Image: IMG_0329 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Pump System (closed loop)



Photo # 27 Image: IMG_0330 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Dirty Water Process Tank from Stack



Photo # 28 Image: IMG_0332 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Tower and water spray inside (down angle)

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019

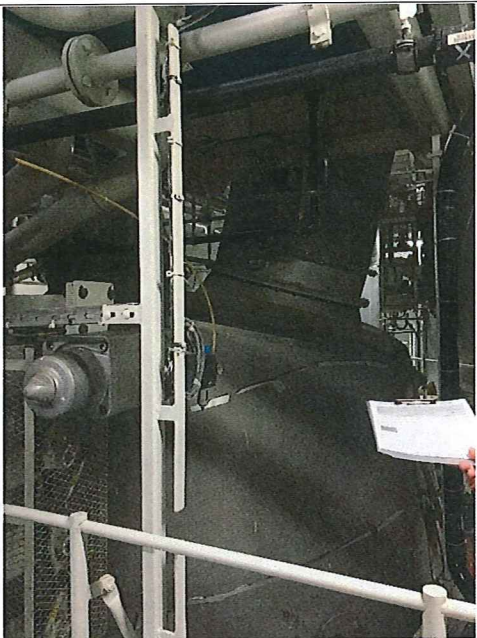


Photo # 29 Image: IMG_0334 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – top of EGCS



Photo # 30 Image: IMG_0335 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Continuous Monitoring System



Photo # 31 Image: IMG_0336 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS - Damper



Photo # 32 Image: IMG_0340 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Bleed-off Treatment Unit

PHOTO ADDENDUM – OVATION OF THE SEAS
ROYAL CARIBBEAN CRUISE LINE
JULY 26, 2019

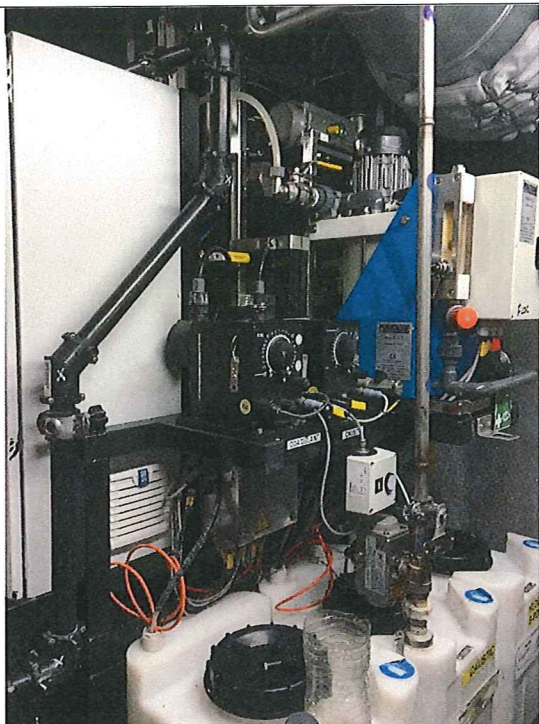


Photo # 33 Image: IMG_0341 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Bleed-off Treatment Unit

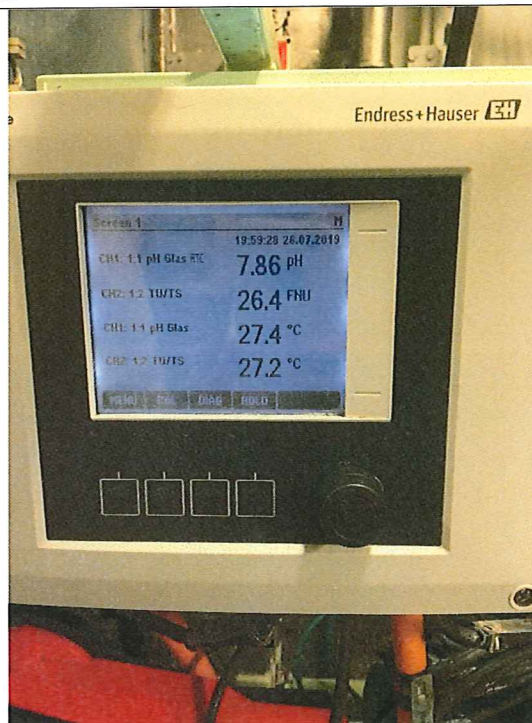


Photo # 34 Image: IMG_0342 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Bleed-off Treatment Unit Monitoring

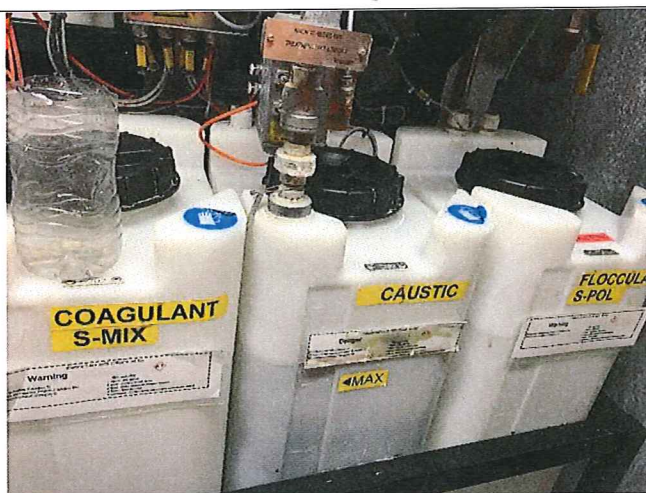


Photo # 35 Image: IMG_0343 Date: 7/26/2019
 Taken by: Amy Jankowiak
 Description: EGCS – Bleed-off Treatment Unit
 Chemical Addition



State of Washington Department of Ecology
**Cruise Ship Memorandum of
Understanding, Cruise Operations in
Washington State Inspection Report**

Northwest Regional Office

3190 160th Ave SE
Bellevue, WA 98008

Phone: (425) 649-7000
Fax: (425) 649-7098

Inspection Date September 8, 2019	Permit Number NA	County King	Receiving Waters Marine Waters	Ecology Inspector Amy Jankowiak
Entry Time: 09:06	Photos Taken	Samples Taken	Inspection Announced	Discharges to: <input checked="" type="checkbox"/> Surface Water
Exit Time: 11:20	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Ground Water <input type="checkbox"/> Dewater <input type="checkbox"/> POTW

Name and Location of Site Inspected:

STAR PRINCESS, Princess Cruises
Pier 91
Seattle, Washington

Additional Participants/Inspectors:

Ben Billick, Ecology
Rohit Lamichhane, Holland America Group

On-Site Representative(s): Name/Title/Phone/e-mail

Simon Whitehouse, Environmental Officer

Responsible Official(s): Name/Title/Address/Phone/e-mail

Patrick J. McGuire, Senior Director of Environmental Operations
Holland America Group
300 Elliott Ave. West, Seattle WA 98119
206-626-3889 PMcGuire@HollandAmericaGroup.com

Other Facility Data:

Notification made to Jonathan Turvey
on September 4, 2019

Flag – Bermuda
IMO #9192363

Section A: Areas Evaluated

<input checked="" type="checkbox"/> Black/Gray Wastewater System	<input checked="" type="checkbox"/> Residual Solids	<input checked="" type="checkbox"/> Records/Reports	<input checked="" type="checkbox"/> Hazardous Waste/ Solid Waste	<input checked="" type="checkbox"/> Sampling/Monitoring
<input checked="" type="checkbox"/> Discharge Locations	<input checked="" type="checkbox"/> Operation & Maintenance	<input checked="" type="checkbox"/> Sludge Handling/ Disposal	<input checked="" type="checkbox"/> Oily Bilge Water	<input checked="" type="checkbox"/> Other

Section B: For Vessels Discharging ≥ 1 nm from Berth and ≥ 6 Knots Only [2.1.3(A)]

<input type="checkbox"/> Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/> Operations as Described in Submitted Documentation	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/> Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: <input type="checkbox"/> Trigger Level for Shutdown: <input type="checkbox"/> Recorded Turbidity/Equivalent Levels Above Triggers:	
<input type="checkbox"/> Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/> Disinfection Effectiveness Monitoring Equipment Functioning Properly	
Disinfection Effectiveness Monitoring:	
<input type="checkbox"/> Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/> Disinfection System Operated and Maintained Properly	
Disinfection System:	

Section C: For Vessels Discharging Continuously [2.1.3(B)]		
<input type="checkbox"/>	Schematics Match Black/Gray Wastewater System	
<input type="checkbox"/>	Operations as Described in Submitted Documentation	
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Turbidity or Equivalent Monitoring	
<input type="checkbox"/>	Turbidimeter or Equivalent Monitoring Equipment Functioning Properly	
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if High Turbidity Occurs	
Turbidity or Equivalent: Last Calibration: Trigger Level for Early Alarm: Trigger Level for Shutdown: Recorded Turbidity/Equivalent Levels Above Triggers:		
<input type="checkbox"/>	Daily 24-hour Continuous Monitoring for Disinfection Effectiveness	
<input type="checkbox"/>	Disinfection Effectiveness Monitoring Equipment Functioning Properly	
Disinfection Effectiveness Monitoring: <div style="text-align: center; font-size: 2em; opacity: 0.5;">NOT APPLICABLE</div>		
<input type="checkbox"/>	Auto Shut Down or Operational Controls to Insure System Shut Down if Disinfection System Upset Occurs	
<input type="checkbox"/>	Disinfection System Operated and Maintained Properly	
Disinfection System:		
Section D: General (Approved to Discharge)		
<input type="checkbox"/>	No Discharges Within ½ Miles From Shellfish Beds/ Protocol (President's Point, Apple Tree Cove, Tyee Shoal, Middle Point (near Pt Townsend))	
<input type="checkbox"/>	Discharges Immediately Stopped When High Turbidity Occurs	
<input type="checkbox"/>	Discharges Immediately Stopped When Disinfection System Upset Occurs	
<input type="checkbox"/>	Immediate Notifications Made to WA Department of Health for Disinfection System Upset	
<input type="checkbox"/>	Sampling Conducted 2/month, 1/month in Seattle (BOD, TSS, Fecal Coliform, pH, Chlorine Residual)	
<input type="checkbox"/>	Whole Effluent Toxicity Testing 1 per 2 Years (homeported) or 1/40 Calls for Continuous	
Section E: General		
<input checked="" type="checkbox"/>	Wastewater Discharge Records Review	Discharge records were reviewed (blackwater/graywater/residual solids) and are maintained properly. No discharges found to be in the OCNMS, MOU waters or Washington state waters (MOU related waters). Further review will be done following the end of the season.
<input checked="" type="checkbox"/>	Wastewater Discharges protocol per MOU and managed properly	The discharge protocols are consistent with MOU requirements to not occur in MOU related waters.
<input checked="" type="checkbox"/>	Residual Solids Managed Properly/Disposal Protocol per MOU	Residual solids protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Hazardous Waste Managed Properly	Hazardous protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	WA Hazardous Waste Guidelines Followed (Appendix vii)	Hazardous waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/>	Solid Waste Managed Properly (zero garbage discharge)	Solid waste protocols are consistent with MOU requirements. Solid waste discharge records were reviewed and are maintained properly. No

	discharges or releases of solid wastes were found to be inconsistent with MOU requirements.
<input checked="" type="checkbox"/> Photo/X-Ray Waste Managed Properly (fluids, cartridges,...) and landed ashore	Photo and x-ray waste protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Dry-Cleaning Wastes and Byproducts (fluids, sludge, filter materials,...) Managed Properly (PERC – haz waste – landed ashore)	Dry cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Unused/Outdated Pharmaceuticals Managed Properly (safely disposed of)	Unused or outdated pharmaceuticals management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Fluorescent and Mercury Vapor Lamp Bulbs Managed Properly (prevent release of mercury)	Fluorescent and mercury vapor lamp bulbs protocols for management are consistent with MOU requirements.
<input checked="" type="checkbox"/> Waste Reduction/Reuse/Recycling Opportunities Maximized (glass, cardboard, aluminum & steel cans)	Waste reduction/reuse/recycling opportunities appear to be maximized per MOU requirements.
<input checked="" type="checkbox"/> Batteries Managed Properly (recycled, reclaimed, disposed of properly)	Batteries management protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Incinerator Ash Managed Properly and minimized volume (haz waste segregation and annual testing)	Incinerator ash management is consistent with MOU requirements.
<input checked="" type="checkbox"/> Oily Bilge Water Managed Properly (<15 ppm, no visible sheen and underway)	Oily bilge water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Ballast Water Managed Properly (per Wash regs –reporting, treated or if open sea exchange >200 nm from outside EEZ, 50nm if not EEZ)	The vessel employs ballast water exchange and does not de-ballast in MOU related waters.
<input checked="" type="checkbox"/> OCNMS rules and regs followed	The discharge protocols are consistent with MOU requirements and are to not occur in OCNMS waters.

Additional General Questions

<input checked="" type="checkbox"/> How is deck runoff and hull cleaning handled (scuppers,...) (non-toxic/phosphate free cleaners, biodegradable)	Deck runoff and hull cleaning protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> How is maintenance performed on the outside of the vessel (paint chipping, painting, etc)	Outside vessel maintenance protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> Sculleries and Galleys – type of detergents and degreasers used (phosphate free and non-toxic)?	Restaurants and galleys use detergents and degreasers that are non-toxic and phosphate free.
<input checked="" type="checkbox"/> How are food waste discharges handled (prevention of erroneous materials)?	Food waste discharge protocols are consistent with MOU requirements and records reviewed show no discharges in MOU related waters.
<input checked="" type="checkbox"/> Medical sinks/floor drains, chem. stor areas wastes go where (plugged, blackwater, bilge)?	Medical sinks/floor drains should be connected to blackwater.
<input checked="" type="checkbox"/> Where is pool and spa water discharged? Dechlorinated/debrominated and underway?	Pool and spa water protocols are consistent with MOU requirements.
<input checked="" type="checkbox"/> What type of fuel is used and percent sulfur content?	<0.1% sulfur fuel content or EGCS treated equivalent is used throughout the route.

Other:

Section F: Sampling Results

Parameter	Results
Biochemical Oxygen Demand 5-Day (BOD ₅)	NOT APPLICABLE
Total Suspended Solids (TSS)	
Fecal Coliform	
Residual Chlorine	
Ph	
Ammonia, Nitrogen	

Section G: Summary of Findings/Comments

Introduction

Amy Jankowiak, Washington State Department of Ecology (Ecology) Northwest Regional Office, Water Quality Program (NWRO-WQ) conducted the inspection of the Holland America Line AMSTERDAM on July 29, 2019. Ben Billick, Ecology NWRO-WQ, assisted in conducting the inspection. The main contacts on board the STAR PRINCESS was Simon Whitehouse, Environmental Officer (EO) for the vessel. Rohit Lamichhane, Manager, Environmental Programs and Management for Holland America Group was also present during the inspection. Prior notification of the visit was given on September 4, 2019 for security protocol. The purpose of the inspection was to evaluate compliance with the *Memorandum of Understanding Cruise Operations in Washington State* (MOU), as amended. The STAR PRINCESS is not approved to discharge wastewater in MOU waters.

The STAR PRINCESS launched in 2001, and is 950 feet long with about a 27-foot draft. The passenger capacity is approximately 3,100 with a crew capacity of about 1,200. The vessel has six engines. The STAR PRINCESS is scheduled for 21 port calls in Seattle for WEEKLY week cruises to Alaska between May 19, 2019 and October 6, 2019. The vessel stops in Victoria prior to the Seattle port call.

Inspection

We arrived and boarded the ship (photo #01) at 9:06 a.m. and began with introductions and a plan for the day with Simon Whitehouse, EO. We started on the Bridge and discussed various waste streams and discharge protocols and locations of discharges with navigation staff. We viewed the fuel bunkering. We then tour of the recycling room with material sorting, recycling, hazardous waste storage, and incineration. Next, we went to the Engine Control Room (ECR) to view records, and then the food chute. We then headed below deck to view the bilge system, the marine sanitation device (MSD), and ballast treatment. The inspection was then finalized with a brief debriefing and I disembarked the vessel at 11:20 a.m.

Discharge Types and Protocols in MOU waters, Washington State waters or the Olympic Coast National Marine Sanctuary (OCNMS) (MOU related waters):

The discharge protocols start with voyage plans for each route which is standard unless there are weather diversions. Adjustments to the route are communicated with staff. In addition, monthly navigation briefings are conducted. When a discharge is to occur, a notification from the bridge is made to ECR staff when they are at least 30 minutes from entering or exiting an area of allowed discharge. All discharges are logged in deck log, ECR log and the NAPA electronic system and printed for signatures. Log comparisons are done daily. All discharges on this route are done outside 12 miles from the baseline (photo #04), which is 12 miles from the outside of the MOU waters and the Olympic Coast National Marine Sanctuary (OCNMS). The vessel travels through the Strait of Juan de Fuca on the way in, stops in Victoria, and then calls in Seattle. On the way out, the vessel goes from Seattle to Ketchikan, Alaska through the Strait of Juan de Fuca.

All discharges are stopped before entering the OCNMS including the Exhaust Gas Cleaning System (EGCS). Fuel switching is conducted prior to EGCS shut-down to assure Emission Control Area (ECA)-compliant fuel is being used. For black water and gray water, the latitude and longitude coordinates are recorded in the NAPA Permeate as their *Sewage and Graywater Discharge Record Book*, which is electronic and was reviewed for recent discharges. The date, time and location of both the start and the stop of the discharges are recorded, along with the discharge valve ID, volume, discharge type, flow rate, speed and distance from land (at start).

Discharge Types

Blackwater and Graywater:

There are three Hamworthy System Membrane Bio-Reactors (MBR) on the vessel: one that treats a combined blackwater and graywater, and two that treat graywater. Black water which includes toilet waste graywater includes accommodation (photo #23) sink and shower water, laundry and pool water.

The effluent from the MBR's in operation is pumped overboard through a permeate tank (photo #29) outside of the MOU related waters or held into double bottom holding tanks. Some graywater on this vessel is held untreated and discharged outside of MOU related waters.

MBR's operation: Grey water or black water is fed to MBR's. The first phase of the process is the Screen Press (photo #24) which filters paper and other solids (screenings) out of the waste stream. The screenings are collected (photo #25) and transported for disposal by incineration. The feed then flows into the first stage of the Bio-reactor (photo #26) which operates as an aerobic biological treatment system. Flow is then transferred from the first stage to the second via the Interstage Filter System (photo #27). Solids from the system are discharged outside of MOU related waters. The clean filtrate is treated through the membranes (photo #28) via high pressure. The final effluent from all membranes is sent

through ultraviolet disinfection (photo #30) and then is directed to holding tanks or discharged overboard (photo #31) outside MOU waters.

Turbidity is monitored on the permeate and additional monitoring is done by on-board staff. The system is operated, maintained and monitored by the ship's staff.

Bilge Water:

Dirty bilge water collected and is sent to the oily bilge settling tank. Liquid moves to the centrifugal oily water separator (OWS) (photo #18). Treated bilge then goes through the bilge control discharge box (BCDB), also known as the "white box" (photo #19) or to the static OWS (photo #17) and then the liquid goes to the white box. The white box's three-way valve sends treated bilge at less than 15 ppm overboard in areas where allowed or recirculates back for treatment. The oily sludge is collected to a sludge box, drummed and offloaded in Victoria on this route. Discharges of clean bilge and offloads of oily sludge are recorded in the Oil record Book. The overboard discharge port is padlocked (photo #20). All bilge equipment is labeled to prevent tampering and the area is monitored and video recorded. All seals, padlocks, fittings and portable pumps are inventoried and checked out for use. If other tanks such as grey water overflow and contact with any bilge, it is then considered bilge and treated as bilge or offloaded. Any such overflow is to be reported to the EO and an incident report is filed with the company. The EO and Engineer confirmed that they are not aware of any rerouting of oily bilge. Staff have multiple ways of reporting any issues to upper staff, the cruise line, corporate and anonymously. Oil volumes are compared of incoming, used, and discharged or offloaded regularly.

Ballast, Pools, and Potable Water:

When necessary, ballast water is treated on board with a filter and ultraviolet light disinfection system (photo #22). Most of the time, ballast is handled with on-board holding, and only on the rare occasions that an exchange might occur, the ballast treatment system is used. The vessel has just recently received a newly updated ballast treatment system (photo #21) that will replace the current one.

There are five pools and twelve Jacuzzis which use freshwater and bromine for disinfection. Pools are discharged overboard outside of MOU related waters and dechlorinated if there is an accident in a pool. The Jacuzzi's are emptied to the graywater system and on to the Hamworthy MBR for treatment.

Potable water is either distilled on board with an evaporator (photo #32) or bunkered. Reverse Osmosis filters the water. Brine is discharged to the seawater.

Food Waste:

Food waste is sorted at the source in galleys and there are 17 pulpers located throughout the vessel food areas. The pulpers pulp food to less than 25 millimeters in size are held in a food waste tank and are then discharged outside of MOU related waters. There are two bins in the food area, one for food to pulp and one for no pulping. Food for off-loading (non-pulped) is stored until offloading (photo #10). A food chute is on board and is locked (photo #12). Vessel staff are trained and the EO oversees management of the pulpers to assure that materials don't go into the pulpers that are not allowed. Used cooking oil is stored and offloaded for recycling (photo #11). Grease traps are on deck two to prevent grease from getting into the pulpers and Hamworthy system. Food waste discharges are logged in the NAPA system and a food waste schematic and discharge matrix is located near food processing and the food chute (photo #13).

Outside Vessel:

No hull cleaning is done in MOU related waters. VGP approved cleaners are used for windows and the deck. Outside vessel maintenance such as paint chipping and painting would only be done at port with Port of Seattle permission following best management practices. Paint touch up work was occurring (photos #02 and #03) during the inspection with tarping around the cherry picker and work being done directly over the cherry picker tarp.

Laundry:

Dry cleaning is not done on board. Laundry water is sent to graywater and the MBR and discharged outside of MOU related waters.

Medication:

Unused or outdated medications and narcotics are incinerated with witness and EO monitoring. Sharps are sent to the hazardous waste locker for off-loading as bio-hazardous waste. Drains from the medical facility should go to the blackwater tanks. Staff was unclear on where it went.

Solid and Hazardous Waste:

Photo waste (photo #08) goes through a silver recovery unit with offloads in Victoria when silver is less than 5 ppm. Tests are logged and kept. X-rays are done digitally without any waste. Fluorescent bulbs are stored until offloading as hazardous waste. Hazardous waste materials are stored separately (photo #14) and offloaded only in Victoria on this route. Solid waste (garbage, recyclables, etc) is collected, sorted (photo #06), and either reused, recycled, incinerated or off-loaded to shore as appropriate. Glass (photo #09) and aluminum are crushed and plastics are compacted (photo #07). Waste minimization efforts are done by tracking, material usage analysis, and minimizing materials. All solid waste is offloaded in Victoria on this route.

Two Incinerators (photos #15 and #16) are used onboard when one hour outside port and outside the OCNMS. Ash is offloaded in Victoria on this route.

EGCS:

ECA fuel-sulfur compliance is achieved either through the use of 0.1% sulfur content fuel with marine gas oil (MGO), or with higher sulfur heavy fuel oil (HFO) treated by the EGCS to achieve equivalent emissions. The vessel uses an Ecospray Technologies wet scrubbers on board which is a wet open-loop system to minimize the sulfur oxide emissions (SOx). There are four of the six engines with Ecospray EGCS's. Seawater is pumped from a sea chest into the vessel and filtered. It is sent to the top of the exhaust towers where nozzles spray the air emissions. A drain line sends the Desox outlet water or wash water to a bag filter that is mixed with a saltwater dilution as buffer and then discharged. Continuous meters monitor polycyclic aromatic hydrocarbons (PAH), and turbidity in the inlet and out of the filter. pH is measured continuously at the inlet and the overboard. The scrubbers are not used in the OCNMS, and it is company policy to not use the EGCS while alongside, using shore power instead. The vessel was bunkering fuel (photo #05) during the inspection and was on shorepower.

During the inspection, we discussed the recent EGCS discharge report to Ecology:

Report:

On August 26, 2019, princess Cruises (though HAG) reported an exceedance of the SO₂/CO₂ ratio that occurred on August 25, 2019. While the Star Princess was en route towards Seattle, the EGCS exceeded the SO₂ and CO₂ ratio tolerance for DG6 from 01:34 to 05:02 LT. DG6 was running on HFO (EGCS in operation) and was stopped at 04:50. On reviewing operational graphs and Compliance Computer Data it was seen that the flow rate for the seawater pump dropped and at the same time the SO₂/CO₂ ratio increased leading to high SO₂/CO₂ ratio. There was an alarm and it was acknowledged by the ECR Watchkeeper. Due to missed / poor communication with EGCS Engineer, and misunderstanding of the situation, DG 6 was left running for approximately 3 hours and 28 mins out of compliance.

Follow-up:

Following the report, Ecology requested and received further information including continuous monitoring system data for the event, which was reviewed. The total volume of the discharge was 874m³ (230,886 gallons). During the inspection, the EO noted a language barrier as the communication failure. A briefing with staff was held and changes to the Safety management System (SMS) are to occur clarifying requirements.

Conclusions and Recommendations

The protocols for discharges are clear. Records were orderly and appeared consistent with the MOU. The treatment systems appear to be operating well.

Continued staff training on EGCS operational requirements is recommended.

Attachments:

Photographs

Copies to:

Patrick J. McGuire, Holland America Group

Jonathan Turvey, Holland America Group

Simon Whitehouse, STAR PRINCESS

Mark Toy, Health

Donna Spalding, CLIA-NWC

Joseph Gellings, Port of Seattle

Alex Adams, Port of Seattle

Amy Jankowiak, Ecology

Ben Billick, Ecology

Central Files: Princess Cruises – STAR PRINCESS; WQ 6.1

Section H: Signatures

<u>Name and Signature of Inspector:</u>	<u>Agency/Office/Telephone:</u>	<u>Date</u>
Amy Jankowiak, Compliance & Technical Assistance Unit Supervisor 	Department of Ecology Northwest Regional Office Water Quality Program 425-649-7195	10/16/19

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 1 Image: IMG_0387 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Vessel



Photo # 2 Image: IMG_0388 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Paint touch up work



Photo # 3 Image: IMG_0390 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Paint touch up work



Photo # 4 Image: IMG_0391 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Bridge – Navigation – entry to Strait of Juan de Fuca near Olympic Coast National Marine Sanctuary

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 5 Image: IMG_0393 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Bridge – view of fuel bunkering



Photo # 6 Image: IMG_0394 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Recycling Room (RR) – sorting and compacting



Photo # 7 Image: IMG_0395 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: RR – aluminum crushing (green) and plastic compactor (silver)



Photo # 8 Image: IMG_0397 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: RR – Photo waste processing

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 9 Image: IMG_0398 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: RR – glass – crushed for recycling

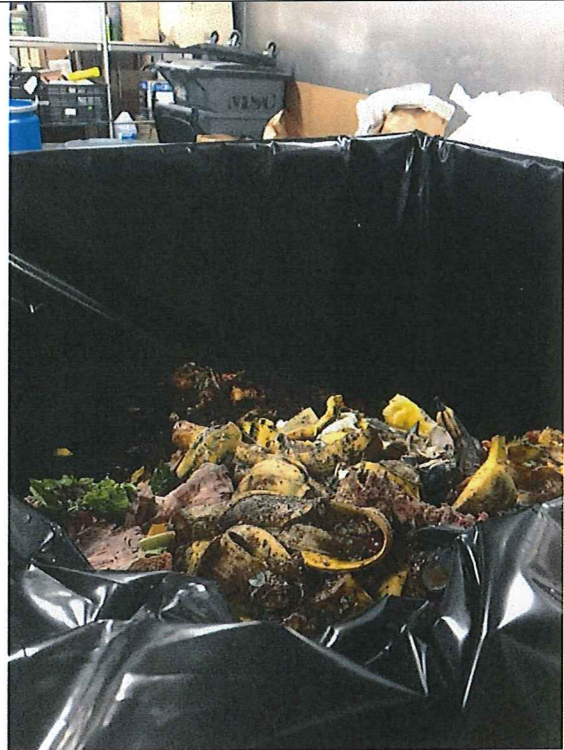


Photo # 10 Image: IMG_0399 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: RR – food for offload (non-pulper)

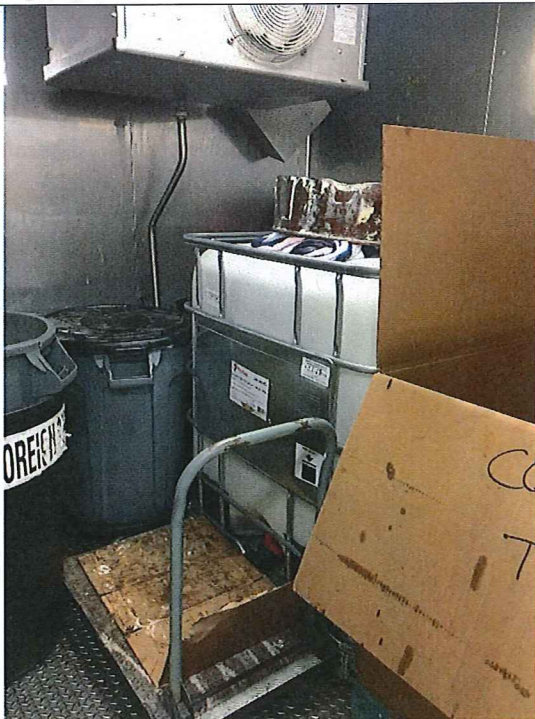


Photo #11 Image: IMG_0400 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: RR – Used cooking oil for recycling



Photo # 12 Image: IMG_0409 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Waste Management – food chute (not used – locked)

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019

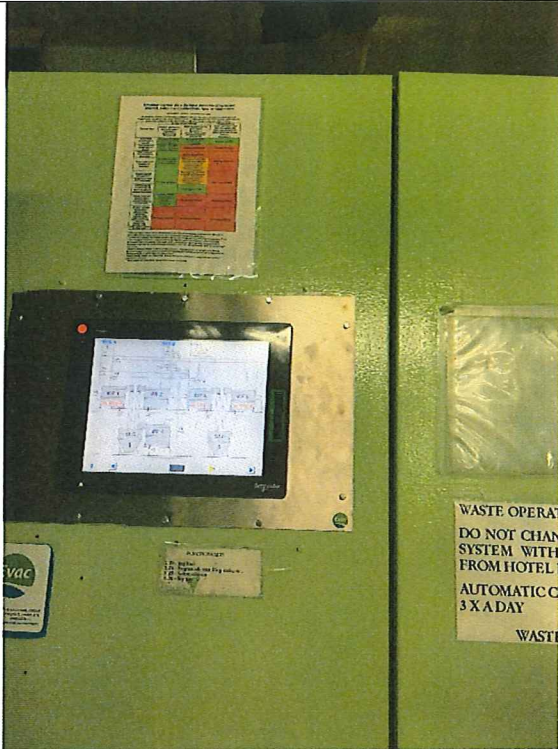


Photo # 13 Image: IMG_0407 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Waste Management – food waste schematic and discharge location matrix

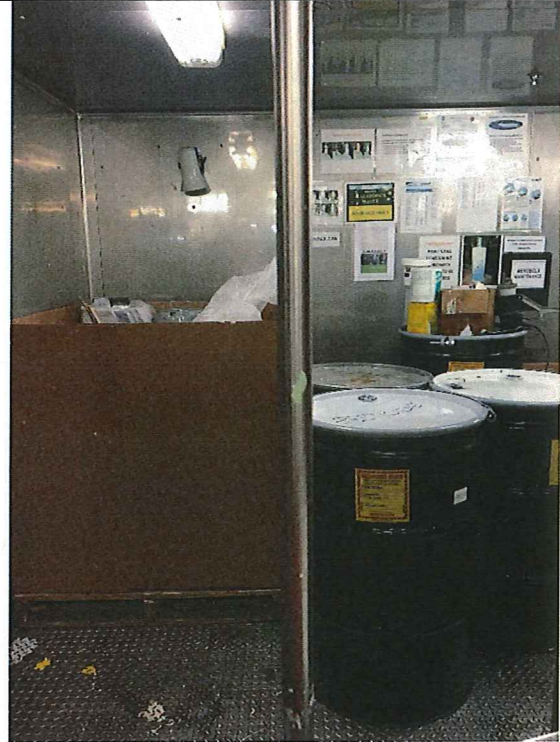


Photo # 14 Image: IMG_0401 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: RR – Hazardous Waste Locker



Photo # 15 Image: IMG_0404 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Waste Management - Incinerator



Photo # 16 Image: IMG_0405 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Waste Management – Incinerator Schematic

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 17 Image: IMG_0425 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Bilge – Static Oily Water Separator (OWS)



Photo # 18 Image: IMG_0427 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Bilge – Centrifugal OWS



Photo # 19 Image: IMG_0410 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Bilge – White Box



Photo # 20 Image: IMG_0411 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Bilge – Treated Overboard

PHOTO ADDENDUM – STAR PRINCESS
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Photo # 21 Image: IMG_0403 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: New Ballast Water Treatment System (not yet installed)



Photo # 22 Image: IMG_0423 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Existing Ballast Water Treatment System

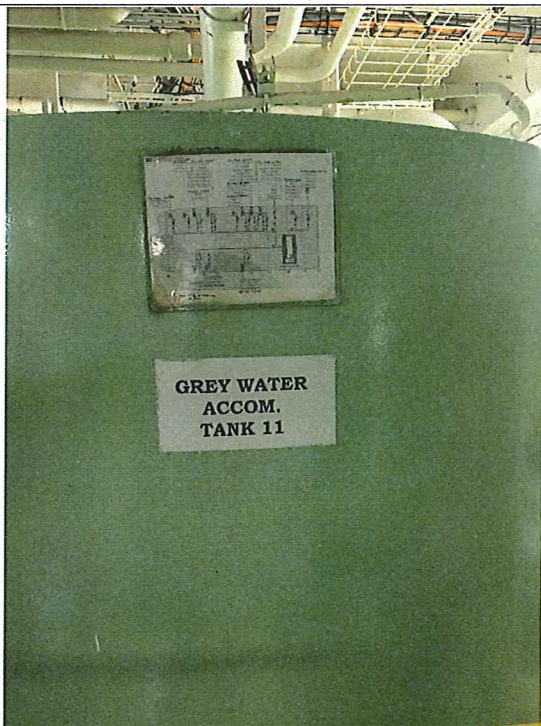


Photo # 23 Image: IMG_0422 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy – Grey water accommodation collection tank



Photo # 24 Image: IMG_0418 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy – Screen Press

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 25 Image: IMG_0419 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy – screen press solids for incineration

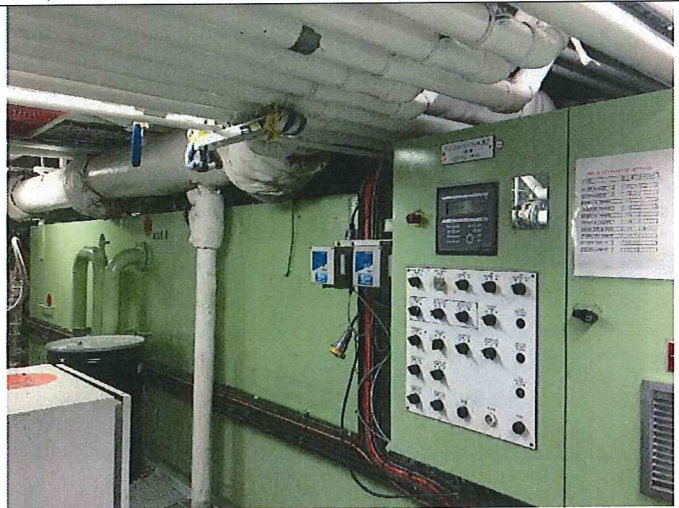


Photo # 26 Image: IMG_0417 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy - Bioreactor

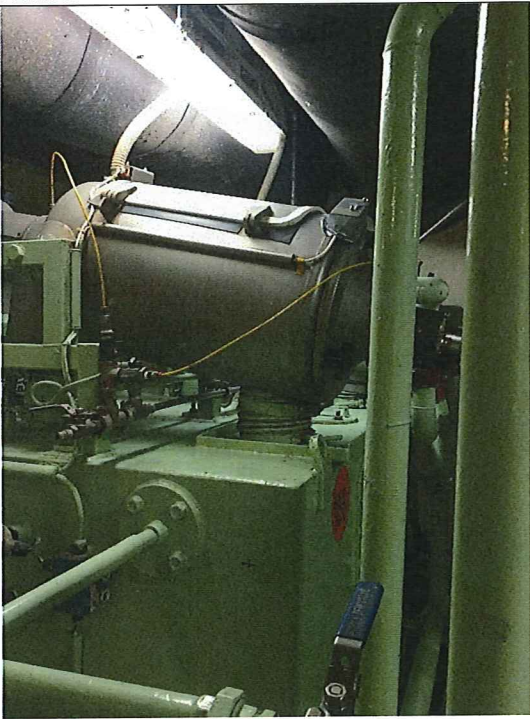


Photo # 27 Image: IMG_0420 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy – Interstage filters



Photo # 28 Image: IMG_0421 Date: 9/8/2019
Taken by: Amy Jankowiak
Description: Hamworthy – Membrane filters

PHOTO ADDENDUM – STAR PRINCESS
PRINCESS CRUISES
SEPTEMBER 8, 2019



Photo # 29 Image: IMG_0413 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Hamworthy - permeate

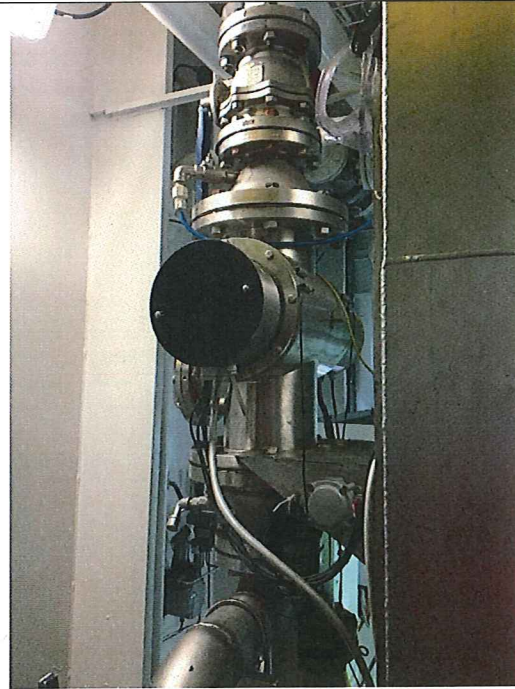


Photo # 30 Image: IMG_0414 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Hamworthy Ultraviolet Light Disinfection

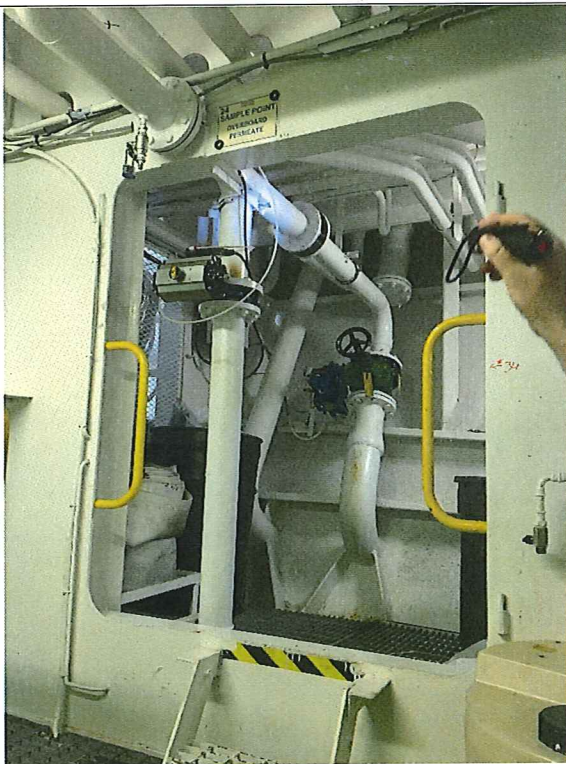


Photo # 31 Image: IMG_0416 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Hamworthy – Overboard Discharge Port

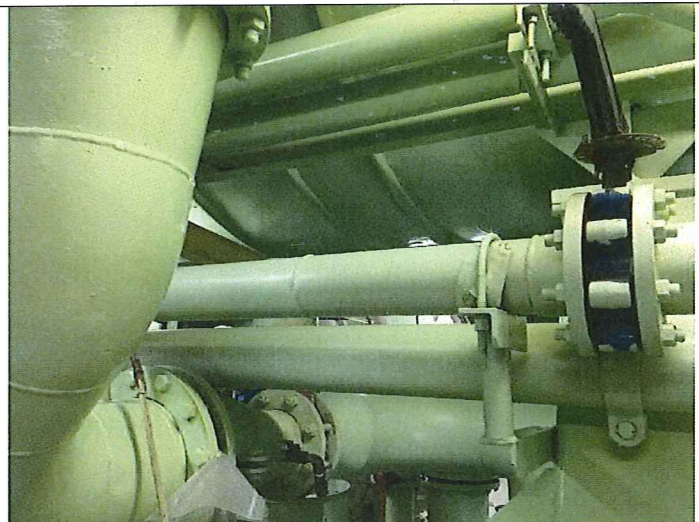


Photo # 32 Image: IMG_0429 Date: 9/8/2019
 Taken by: Amy Jankowiak
 Description: Evaporator

